AN ANALYSIS OF OLDER COUPLES' CONVERSATIONS WITH AND WITHOUT THE STRESS OF HEARING LOSS

By

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To examine how the disability of hearing loss affects couples' communications and to confirm the accuracy of perceptions previously reported by couples with hearing loss, this study analyzed recorded conversational content. The screening process included completing a demographic questionnaire, the screening form of the Hearing Handicap Inventory for the Elderly, and a voluntary consent form. Forty older adult couples (mean age = 65.34) were divided into two groups by level of male hearing acuity with females in both groups having normal hearing ability. Acuity was established using a portable pure-tone audiometer for a pass-fail screen at 45 dB SPL for frequencies of 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz. Males with hearing loss later obtained a confirming audiogram. Two 5-minute conversations were audio-recorded in quiet and simulated noise environments.

Comparisons of responses were analyzed by variables of gender, group, and environment. Participation was measured by tabulating the number of thoughts (idea units) expressed by each subject and by timing the amount of subject talking time as a percentage of the time used by the couple. Conversations were encoded into six categories of communicational intent. Topic patterns were examined for topic initiation responsibility and amount of topic support received. Elements of conversational breakdown measured were content repetitions, comprehension breaks, congruent talking, and comments made on the passing of the required conversational time.

Results indicated the women in the group with normal hearing led their husbands and subjects in the group with hearing loss in percentage of talking time used. Both women and men in the group with normal hearing generated more idea units in the nonstressed (quiet) environment. The group with normal hearing made greater use of neutral statements and nonspecific confirmations, which served to prolong conversation and contained less specific information. The group with hearing loss used more direct statements and humor categories. This group also experienced fewer topic changes and more disruptions to their conversational flow. The study results agree with findings reported by other investigators from questionnaires and interviews that spouses share the functional disability with their husbands when a hearing deficit is recognized.

CHAPTER 1
INTRODUCTION

Acquired hearing loss in adults is the fourth most prominent disability in the United States (Kricos, 1995). For males 45 years and younger, hearing impairments were reported by 43.2 /1000 persons (U.S. Dept. of Commerce, 1996). This increased to 191.9/1000 persons in the range from 45 to 64 years old. In age groups from 65 to 74, the number was 298.8/1000 persons, and at 75 years and older the number rose to 447.1/1000. This jump of over 1000% is reflected similarly in the female population in this 1994 report, based on 1990 census figures (U.S. Dept. of Commerce, 1996).

The estimations of hearing loss in the older population vary greatly due to differences in the definition of hearing loss, but there is little debate that the incidence of hearing loss increases as age advances. Because of the aging of the U.S. population, the percentage of people older than 65 years with hearing impairments will increase to 46% by the year 2000 and 59% by 2050 (Kricos, 1995). As a greater proportion of our population approaches retirement age, this difficulty will be encountered more frequently by the couples of the "baby-boomer" generation. Although it was found, when studying British couples after World War II, that the existence of hearing loss did not increase the possibility of divorce, those with hearing loss did perceive life as less satisfying (Thomas, 1984). Expectations today may be different from those of the British couples studied. Now, quality of communication is thought to be crucial for maintaining a supportive marriage relationship and particularly necessary in the adjustment process for dealing with change (Fitzpatrick, 1988).

Literature Review

Effects of Acquired Hearing Loss in Older Adults

Acquired hearing loss has been described as an invisible disability (Hetu, 1996). In an interview, Mary S. Anderson, born in 1912 (personal communication April 5, 1998) was asked to tell about her memories of hearing loss in the elders she had known as a child. She did not recall knowing anyone with a hearing loss except one man at church who used a horn. She did say, however, that adults were noticed to cup their hands behind their ears to hear better, but these people were not considered hearing disabled, only that they needed extra effort to hear.

While the need for glasses seems to have been accepted by society and in some cases is even considered a fashion item or a sign of intelligence, hearing loss today is associated with a general decline in function. The need and use of hearing aids is approached clandestinely by many of those affected. The hearing loss *secret* is kept by other members of the family and is reinforced both by strategies of social isolation and by protective strategies in social situations. By participating in these strategies and not addressing the hearing loss directly, the family reinforces the perception of hearing loss as shameful. Furthermore, the family receives little support from others in their social group when they acknowledge the hearing loss. Kyle (1987) quoted a wife who explained that her neighbors, family, and friends were not sympathetic to the development of a hearing loss by her spouse. She said everyone seemed to understand the disability of having broken legs or a disease, but they did not understand how difficult it could be living with a spouse who could not hear you.

Whether or not the hearing loss is acquired as a result of occupational exposure, an accident, or a disease process, acquiring a hearing loss as an adult also has a linked negative connotation of becoming old (Hetu, 1996). In the current culture of the United States, with the increasingly rapid pace and pressure to produce, persons with hearing loss are further undermined in their own perception of their ability to compete. The consumer market providing audiological remediation has fortified these opinions or prejudices by making amplification devices which can be hidden, and by targeting their advertisements to the older market, specifically to the retirement community. This further emphasizes the association of hearing loss with an approaching nonproductive stage in life.

A hearing impairment may negatively affect a person's ability to function independently. Safety for living alone may become an issue as the ability to hear alarms, doorbells, telephones, emergency messages, and traffic becomes less distinct. Because of increasing difficulties in communication, older adults with hearing impairments may become more isolated by interacting less with family and friends and attending fewer social functions than they had previously enjoyed. They may no longer use their radio or television and may find other forms of entertainment less satisfying. Also, they may become less assertive with tradesmen and physicians. The overall quality of life may decline sharply (Kricos, 1995).

These problems are not experienced by retired adults alone but by employed adults as well. In a 1960s British study, Nett quoted adult males describing instances of everyday difficulties associated with their acquired hearing loss.

> Everyday, I take a fella back and forth to work in my car. I can't hear him well at all; he has a low voice. . . . I turn up the car radio, then he has to talk louder, and then I can hear.
>
> The last time I went to a dance, which was about two weeks ago, I was dancing with somebody else's wife. I was carrying on, or trying to carry on, a little conversation. I get embarrassed because I can't hear what she is saying. There's too much noise from the orchestra and people around you. You just don't hear a person that's talking softly next to you. . . . You do what a lot of people who are hard-of-hearing do without realizing it--you talk, rather than listen . . . you become a bore.
>
> I was at my brother's house last night. There was some conversation I didn't hear. I had to guess when to laugh. A couple of times I guessed wrong.
>
> Today at work all the fellows were eating lunch together. I just can't hear well in a bunch like that. I went over by myself and ate . . . this happens almost everyday. (Nett, 1960, as cited in Thomas, 1984, p. 65)

In classifying the consequences of the critical incidents, Nett assigned them to four behavioral groups, in ranked order of importance:

> 1. Suffers damage to self-esteem: feels foolish or stupid and may show anger towards self.
>
> 2. Feels hostility toward or from others: job may be affected by arguing or feeling unconcerned.
>
> 3. Withdraws from conversation: feels strain and a need to anticipate future situations.
>
> 4. Inconveniences someone: feels others don't understand, feels constrained from attending social activities or office events. (Nett, 1960, as cited in Thomas, 1984)

Oyer and Oyer (1979) agreed with many of these areas of difficulty. They gave examples and suggested social consequences that are directly related to auditory deprivation.

1. Embarrassment--Frequent misunderstandings of requests for information and inappropriate responses to conversational topics are a source of embarrassment in social interactions and may cause communication withdrawal.

2. Fatigue--A hearing loss may generate fatigue in persons trying to make themselves understood by those with a hearing deficit. Similarly, fatigue is experienced by persons with hearing losses who strain to comprehend shared communications. Fatigue is a direct result of the increased effort during these conversational interactions.

3. Increased irritability--Individuals with hearing losses may become irritated with social interactions because of frequent errors and anticipated failures in situations requiring interactive communication.

4. Increased tension--Significantly increased marital tension has been reported between husbands and wives as a function of hearing loss.

5. Avoidance and withdrawal--As mentioned above, the increased effort needed to communicate combined with the potential for failure may influence both the speaker and the listener to avoid or withdraw from nonessential communication. In some instances older adults with hearing losses chose caution over other options, limiting the tasks they undertake to those that offer a high potential for success. This supports informal observations made by clinicians of social withdrawal in elderly persons with hearing handicaps.

6. Increased endangerment to bodily safety--Older adults have been injured and even killed by not hearing signals, alarms, warnings or horns in time for a safe response.

7. Boredom--Some older adults with hearing losses use the conversational strategy of producing a monologue in order to control interactions which, consequently, reduces the communicative interest for social partners who are cut off from participation in the conversation.

8. Rejection--Older adults report feelings of social rejection as an outcome of missing what is said and, thereby, being left out of information about family and social events.

9. Increased vulnerability to promises of restored hearing--Older adults with hearing handicaps may be taken advantage of emotionally and financially in their desire to obtain a “cure” and return to natural hearing.

10. Depression--In older adults the increase of age-related diseases and conditions, as well as the inability to control these states, may lead to despondency. With hearing loss, these feelings of reduced abilities may also lead to suspiciousness or even paranoia.

11. Acting upon misinformation--Older individuals have been cited as more vulnerable to misinformation because of slowing, or missing, temporal and amplitude cues. This is a particularly noted in noisy social environment.

12. Negativism--A lack of response and a slowing of response by older adults with hearing impairments can be perceived by others as an attitude of disinterest.

13. Diminished opportunities to assume leadership roles--Hearing loss can add to feelings of loss of value to themselves and others; feelings already related to retirement and to change of work roles for older adults.

14. Reduction in amount of information--The older adult may be handicapped by receiving reduced information, thus blocking his ability to participate in active life styles and hampering wise decision making.

Hetu (1996) stated the most basic need of people with hearing impairments was to enhance their social image. Social incompetence was consistently more tolerable than being viewed as a person with hearing impairment. In other words, of a person with a hearing impairment tends to avoid being looked at as deviant because of the hearing disability. The work place was one context in which various negative impacts were most strongly felt. Male workers with acquired hearing losses reported receiving the strongest disparaging statements from co-workers. Such statements were generally formulated as jokes, making it difficult for the discredited person to challenge the negative view associated with such labels (Hetu, 1996). Hearing loss was found to be associated with images of mental disability, weakness or failing, general disability, and looking old in a market study (Hetu, 1996). The double stigmas attached to aging combined with hearing impairment were closely associated with the image of deafness (Hetu, 1996). In a United Kingdom study in 1981, it was discovered that people did not distinguish between manifestations of deafness and manifestations of hearing impairment (Bunting, 1981).

Jones, Kyle, and Wood (1987) found persons with an acquired hearing impairment shared a degree of prejudice toward deafness and hearing loss similar to that held by the general population. The negative image attached to the hearing impairment is inflicted back upon oneself. This is a process of alienation whereby people run the risk of not only of being cut off from others because of the "shameful" attribute but also from themselves by endorsing others' views (Hetu, 1996). The stigma of hearing impairment strongly interferes with the search for effective solutions to listening and communication difficulties; that is, one does not actively solve problems that are not acknowledged. The stigma helps explain why only a fraction of the population with hearing impairment seeks professional help. The effect of the stigma also helps explain why so many hearing aids are sitting in drawers (Hetu, 1996).

Hetu (1996) provided a synopsis of difficulties in acknowledging a hearing problem as expressed by people with occupational hearing loss.

Denial of problem

1. Asserts that the hearing problem is not important.
2. Ignores or does not notice the differences between what is said by the person who is hearing impaired and what is said by the spouse.
3. Blames other causes for the problem
    - reduced perception of the scope of the problem,
    - reduced acknowledgement of difficulty of discerning sounds,
    - reduced acknowledgement of talking in an over-loud voice,
    - reduced acknowledgement of a problem in communicating with others,
    - reduced acknowledgement of a difficulty in comprehending
    - someone who is not relatively close when speaking,
    - focuses attention away from the communication,
    - blames the person to whom the communication is directed,
    - loses desire to communicate,

- retains unchanged habits of living acquired prior to the noise exposures,
- blames environmental factors,
- does not attend to or heed warning sounds, and
- connects hearing acuity with emotional states.

Downplaying the importance of the problem

1. By the person with hearing loss.
2. By the spouse.
    - viewing the problem as contained within the family circle,
    - by demonstrating her ability to handle any problems that arise,
    - by lessening the importance of the problem's outcome,
    - by asserting that the problem occurs intermittently,
    - by disclaiming the additional effort needed to compensate for the hearing difficulties,
    - by attributing the problem to other causes, and
    - by not noticing inconsistencies in what the person with the hearing loss is saying.

Not wanting to discuss the problems or the ramifications

1. Lack of support for sharing information or experiences relating to the hearing problem.
2. Distancing personal hearing problems from those of others with hearing loss.

Attempts to view the hearing problem as part of normal life

- by stating that developing hearing loss is an expected
- sacrifice for maintaining employment and
- by stating the similarity of the hearing problem to those of co-workers or friends (Hetu, 1996).

As part of the Albertina Project, an epidemiological study of 706 people in Sweden over the age of 75, responding by postal questionnaire, hearing loss was found to have less impact on the perception of health than either mobility or sleeping problems (Lindgren, Svardsudd, & Tibblin, 1994). Whereas this might be explained as a cultural or cohort difference, it is interesting to notice that the majority of respondents with hearing loss judged themselves as having no problems when talking with a single person. Further, in most cases, there were no problems reported even when talking with more than one person. There seems, then, to be a wide diversity in the manner in which hearing loss is perceived or experienced.

The degree of hearing loss severity was not a differentiating factor for men that responded to questions concerning denial of their noise induced hearing loss (NIHL). The respondents indicated no association between the severity of the hearing loss and the acceptance of the disability (Hetu, LaLonde, & Getty, 1987). In contrast, Jones recounted the greater the degree of deafness, the more likely avoidance would be used and the more likely anger would be shown. He found women more likely to be angry and frustrated, while men were more likely to joke about it (Jones et al., 1987). In interviews with men and women with hearing deficits, Hallberg (1996) identified three types of coping mechanisms commonly practiced: escape coping or wishful thinking, passive coping or avoiding strategies, and active coping. In confirmation of the escape or avoidance strategy use, it was found that several of the workers questioned with NIHLs revealed that they had never discussed their hearing loss with their family (Hetu et al., 1987). If the amount of hearing loss is not a motivating consideration for adjustment, then how is a hearing impairment disabling?

In a study that investigated the effect of a hearing disability on marriage and the psychological components related to hearing loss, 205 adults of employment age with hearing loss completed the States of Anxiety and Depression Scale (SAD) and were compared to a similarly aged control group in Britain. The comparison showed that persons with mild to moderate hearing losses were not inclined to have a higher rate of divorce, but the effect of the hearing loss on marriage and family life were significantly associated with psychological disturbance. Persons with hearing disabilities were not likely to lose their jobs; however, they demonstrated more worry about their jobs and tended to be more unhappy at work. They had fewer friends and found making friends more difficult than the control group. They were also found to perceive life in general as less satisfying (Thomas, 1984).

Lormore and Stephens (1994) designed an open-ended questionnaire to identify the most important difficulties experienced by persons with hearing loss and their spouses. One hundred twenty-one couples participated in the study. Although patients with hearing disability noted difficulty at work, this was not reported by any of their spouses. Employment worries related to hearing disabilities included the threat of dismissal or the direct loss of a job, the strain of having to hide the disability in order to sustain credibility, acceptance of lowered expectations and financial constraints, and not seeking employment challenges for fear of failure and resultant low confidence levels.

Men were found to use different coping strategies at work (Hallberg, 1996). Avoiding strategies were significantly more used by men in general, but in situations related to work and in situations judged by men to be important, controlling strategies were also used. Controlling strategies were more frequently reported to be used in situations involving one or only a few close people (Hallberg, 1996). In interviews with hearing disabled workers, Jones et al. (1987) noted impaired individuals showed more irritation and aggression at home than at work, and the spouse was described as the least understanding person (Jones et al., 1987).

The home environment is perceived differently by the disabled worker (Hallberg, 1996; Lormore & Stephens, 1994). In interviews, Hallberg found workers describing feelings at home of less pressure for attentiveness and less need for concentration allowed them to relax. Workers said they had no problems with their hearing at home. Workers did say, however, that the frequent mumbling of their wives was a problem if faces were turned away from their husbands while they were talking. The husbands with NIHL perceived their family lives as being the same as always, as having no change from their hearing loss. Upon continued questioning, the men admitted to having had a more restricted social life as they were unwilling to go with the spouse to movies, the theater, or to a party. In interviews conducted by Lormore and Stephens, some respondents reported the loss of music for relaxation and enjoyment as important. Children interviewed by Hallberg reported to turn more often to the mother with normal hearing, thus leading to an imbalance within the family and causing less involvement by the father in daily life.

The Impact of Noise on Communication

Hygge, Ronnberg, Larsby, and Arlinger (1992) studied the effect of noise on adults with hearing loss and adults with normal hearing. A differentiation was made between the types of noise used: speech noise that could be understood, speech noise that could not be understood, and broadband noise. The results showed that the subjects with hearing loss were equally affected by all three types of noise, while those with normal hearing coped easily with the two speech based noise samples but less well with random noise. Hetu et al. (1987) and Kyle (1987) found during interviews that people with a hearing loss mention background noises cause their ability to follow a conversation to diminish. They tend to expend greater effort when communicating in a noisy, as compared to a quiet environment. Erber, Lamb, and Lind (1996) reported, within their practice, that clients who talked in quiet places found their aid to be helpful, but hearing aid wearers who conversed in noisy places rated their aids low in benefit. The noise associated with multiple talkers at social activities led to frustration and multiple errors of content comprehension for the person with the hearing impairment and, consequentially, greater responsibility taken by the spouse to manipulate the situation so as to project a normal image for the couple (Hallberg & Barrenas, 1993).

Spouse Perceptions of Hearing Loss

A hearing loss is a personal disability that has ramifications for the family's communication system and, in particular, for the spouse of the person with hearing deficits. The role of the spouse has become recognized as influential in motivating the family member with a hearing loss for successful adjustment, rehabilitation, and maintenance of healthy self-esteem (Getty & Hetu, 1991; Hallberg, 1996; Hallberg & Barrenas, 1993; Hetu, Jones, & Getty, 1993; Jones, 1987).

Problems with family communications are viewed differently by the spouse compared to the perspective of the male with hearing loss. Most spouses described frequent misunderstandings and increased irritation levels in the family due to their husbands' hearing losses. They report that interpersonal relations were affected and involved less intimate talk and joking (Hallberg, 1996; Jones et al., 1987).

In a study of 12 adults with hearing loss and 8 adults with normal hearing as a control group, Caissie, Dawe, Donovan, Brooks, and MacDonald (1998) found participants with hearing loss used strategies of conversational control. These behaviors included expressing longer speaking turns than their partner, asking few questions, and shifting topics to those which were familiar or concerned themselves. This control was more evident when speaking with unfamiliar partners but was present with known partners as well. Requests for clarification were more likely to occur with familiar partners, but these requests were primarily of a nonspecific type and partners were faced with the need for frequent repetition of conversational content for comprehension.

An open-ended questionnaire was presented to 52 couples identified with a hearing loss at a clinic or at a hospital in Wales. The couples were asked separately to list the difficulties in the order of importance they experienced for themselves and for their partner. There was no difference between the number of problems the patient identified for him/herself and those identified for the patient by the spouse, but there was a difference between the number of problems reported by the significant other (SO) and the number listed by the patient for their spouse. The spouse was more likely than the patient to mention psychosocial and communication difficulties. The most common communication problem mentioned was necessity of repetition. This was mentioned more by male SOs than by female SOs. The second most mentioned problem, of having to speak louder, was reported equally by SOs of both sexes. The most commonly reported psychosocial problem was frustration, listed by 19% of the SOs and 13% of the patients. Dependence was occasionally reported by the SO if the patient was a man but not reported if the patient was female and was not likely to be reported by the patients themselves (Stephens, France, & Lormore, 1995).

Areas of communication breakdown identified in spouse (female) interviews are summarized as follows: (a) misunderstandings due to husband not answering, responding inappropriately, or asking for repetitions, (b) reduction in the frequency of interaction with husband (both intimate and everyday companionship), and (c) reduction in the content of communications leading to restricting conversation to more important matters (Hetu, LaLonde, & Getty, 1987; Jones et al., 1987).

Hetu and his associates (1993) provided a list of the handicaps mentioned frequently by spouses that affect their personal life. These include (a) effort and irritation (repeating, interpreting for husband with others, tolerating loud sounds, preventing annoying children's noise, always answering phone), (b) stress and anxiety (not being able to count on husband in dangerous situations, traumatizing experiences due to inability to communicate), (c) social life restriction as a couple (isolated as a couple at parties, leaving parties early as a couple, fewer opportunities to go out), (d) negative image as a spouse (embarrassed by husband's loud voice, feeling the weight of her husband's stigma), and (e) negative impact on family life (less companionship, fewer intimate conversations, blocked communication, increased tension within the couple, children feeling uneasy, potential sorrow or disappointment because of being isolated in the family).

Spouses also experienced other, more specific, handicaps related to communication with their husbands. The interactive handicaps felt by spouses were similar but included irritation and impatience concerning misunderstandings, restriction of leisure activities, taking phone messages for husbands, being upset when partners do not make the effort to understand, resentment for the husbands living in their own worlds, feeling guilty because of impatience with their husbands, and feeling the burden placed on them is not appreciated by their husbands (Hetu et al., 1993).

The use of alcohol was reported in spouse interviews to increase listening and communication problems associated with hearing loss (Hallberg & Barrenas, 1993). With the use of alcohol, spouses reported a personality change in the men as evidenced by increased aggression and carelessness, specifically with less concentration on listening (Hallberg, 1996).

Hetu (1996) focused on the need for education and professional support for both the victim of occupational hearing loss (OHL) and the family. Family relationships are a major sphere of social integration and reflect the consequences of an OHL. The person with the OHL and the family need to understand better the loss of frequency resolution that results in poor speech discrimination in noise. Without this understanding the hearing disability appears to be considered more as the result of distraction, lack of concentration, or unwillingness to communicate than as the consequence of a hearing problem (Hetu et al., 1987). The person with the impairment feels powerless and isolated while the person who is unimpaired feels frustrated and angry; the problem is shared, but the solutions are not (Hetu et al., 1987).

After conducting interviews with ten spouses (mean age = 52.5) of males with NIHL, Hallberg and Barrenas (1993) identified two core concepts of concern. The husbands were reluctant to acknowledge hearing difficulties and the influence of the hearing losses on the couples' intimate relationship. Many wives commented on male gender expectations of strength and invulnerability as the reason for their husbands' inability to accept their hearing losses. Most spouses were also unaware of the risks to their husbands' jobs resulting from the acquired hearing loss. Four types of coping strategies used by the wives to adapt to their husbands' hearing disability were described:

1. Co-acting strategies--The co-acting spouse does not view her husband as hearing disabled, rather as "perfectly normal." She will not admit the hearing loss as having any effect on the intimate relationship and is unwilling to discuss the issue. She and her husband strive to project a normal social image and engage in mutual adjustment to the disability. However, spouses using co-acting or mediating strategies carry a heavy load of responsibility when they attempt alone to protect the status quo. This can be exhausting and may lead to a fear of change.

2. Minimizing strategies--The spouse attempts to minimize the effect of the hearing impairment, often participating in the game of denying the hearing loss but will admit some influence on the couple's relationship. These spouses

seek to avoid marital conflicts and strive to present a socially normal appearance to others. These spouses often regard their husbands as altered and may blame age or family history rather than the hearing disability for problems. Spouses using minimizing strategies report experiencing high levels of tension.

3. Mediating strategies (controlling, navigating, advising)--The spouse tries to control the situation by listening for herself and her husband. She navigates her husband away from potentially difficult situations and advises her husband as to his responses. She does not deny the hearing loss and neither does she admit any impact on the relationship. The spouse takes on the responsibility for maintaining a normal social front. The strategies used by the spouses who are thought to best influence the motivation of the husbands to seek audiological rehabilitation are "mediating" and sometimes "co-acting."

4. Distancing strategies--The spouse does not deny the hearing loss and readily admits to problems related to the hearing disability. Communication is minimized and the spouse establishes a separate social identity. Spouses using distancing strategies risk a breakdown in their relationship.

Professionals have increasingly welcomed the presence of the spouse in rehabilitation programs as they realize that to educate the person with the hearing impairment alone is inadequate. The spouse's understanding of the effects of the hearing loss experienced is also necessary to confront unrealistic expectations and unjustified hurt feelings resulting from a lack of basic knowledge.

Getty and Hetu (1991) found that subjects who participated in a formal rehabilitation program in Canada had (a) decreased perceived severity of problem of NIHL, (b) less annoyance by the spouses for the TV volume being loud to accommodate the worker with the hearing loss, (c) an increase in perceived handicap associated with leisure activities, and (d) an increased perception of being set apart from others. Spouses reported feeling less burdened by the need to be responsible for facilitating their husband's participation in group conversations. Workers reported that being more aware of their hearing loss had reduced, if not removed, some of their perceived negative self-esteem issues. Knowledge from the program enabled them to predict difficult situations and to increase their feelings of control. Workers were also noted to be more talkative and exuberant in their manner after participating. The article did not state the percentage of workers who obtained hearing aids or telephone amplifiers following the program, however approximately 28 workers were mentioned as having instigated some sort of action (Getty & Hetu, 1991).

In an experimental program of group rehabilitation, 53 Swedish males with NIHL identified as possible participants through local industrial health personnel services were divided into two groups. Twenty-seven subjects underwent a group rehabilitation program, whereas 26 subjects served as controls with no formal rehabilitation program. A total of 27 experimental-group males with significant others participated in groups of 6 males (12 members total) using paired male and female group leaders. The group format consisted of four 3-

hour sessions with the content chosen to provide knowledge on NIHL. The group objectives were also to offer psychosocial support to the couple, to initiate active problem-solving processes to reduce communication difficulties within the family, and to facilitate the acceptance of the NIHL while strengthening self-esteem (Hallberg & Barrenas, 1994). A series of questionnaires were used to evaluate progress. The findings showed the males in the control group maintained a fairly consistent rating of their disability (HSS scale) and their perceived handicap (HMS scale). The males that participated in the group sessions exhibited a mild decrease in their judgment of disability and a significant decline in the perceived handicap. However, no significant difference was found between the program and control male groups in a four-month follow-up questionnaire. Group participants reported increased knowledge related to NIHL and greater awareness of the nature of NIHL. They were also more aware of communication facilitating strategies and coping strategies to be used for the future problem solving needed in their daily life. This program included a dropout rate of 55.6% of the male group members. These dropouts had significantly higher levels of education than other members of the group. The spouse was found to play a role in motivating or inhibiting the couple's participation (Hallberg & Barrenas, 1994).

Comparisons of the two programs indicated that when a known and trusted associate completed recruitment, more concrete action and awareness changes were maintained three months after program completion. Workers in the Canadian programs commented that their wives' initial interest level was higher than their own and that this had a strong influence on their decision to participate in the program (Getty & Hetu, 1991). This may speak to the high dropout rate experienced in the formation of the Swedish program. The positive benefit mentioned for the Scandinavian worker with NIHL was shared understanding by others in the group.

The inclusion of the wives was seen as positive to the group interactions. The wives' involvement was identified as being particularly helpful both in solving the couple's communication problems and in sharing with the group emotionally charged personal experiences related to hearing loss. Many workers reported they were more able to share emotions and problems with their wives present than in discussions with males alone. The wives were more inclined to talk about the psychosocial disadvantages that resulted from hearing problems. The wives also served as effective facilitators, moving the discussion from the negative effects of hearing difficulties toward ways of preventing problems and encouraging their husbands to take steps to solve hearing-related problems (Getty & Hetu, 1991).

The importance of an effective communication system for couples cannot be overstated. Hummert, Nussbaum, and Wiemann (1994) said that the aging process is not experienced alone but is part of a changing interactive presence throughout the lifespan. Communication is said to provide happiness and satisfaction as well as serving to meet basic needs for companionship, success, and survival. Interpersonal communication is felt to be as essential to survival as any biological or physical function of life. The ability to maintain relationships is based on the ability of older adults to adapt their personal communication system to changes that occur with aging. Interpersonal communication competency and a continual adaptation process are important contributors to the ability to age successfully.

Considerations in Analyzing Older Adult Couples' Conversations

Many methods have been developed to analyze conversations of normal adults, both verbal and nonverbal. A methodology of analysis devised by Soskin and John (1963) for the study of couples' conversations was chosen for this project. This system was presented as one of the classic methods of content analysis described by Markel (1998). Gallois (1998) viewed semiotic psychology as having an essential feature, a belief that speech behavior, both linguistic and paralinguistic signs, indicates the mental states of the speakers. Markel (1998) described two perspectives as paradigms for examining discourse: ideographic and nomothetic. The ideographic perspective is one in which the investigator studies an individual and is interested in what is unique and particular to that single situation. The nomothetic perspective is one in which an individual's discourse experience is studied in order to draw generalities and to recognize tendencies of behavior typical of a specific group. Social scientists primarily use the ideographic paradigm for their research as they are attempting to understand and explain individualistic behavior and study unique situations in depth. Statisticians and psychologists who seek to study subjects who represent larger populations favor the use of the nomothetic perspective. The nomothetic perspective was used in this study with the same expectation, i.e., that the results will generalize to other older adult couples confronted with hearing loss.

Markel (1998) contended that spontaneous speech analysis can extend past the examination of exact phrases to reveal the purposes underlying the different ways in which conversation can be used. Conversation can be for interpersonal solidarity, to recognize stereotyping and prejudice, as stimuli or response to social environments, to reflect social roles, or as the means to demonstrate certain internal states. While previous research reflects self-reported responses, the research of this study investigated actual conversations. It is possible that in interviews of couples adjusting to the onset of hearing loss, the conversational difficulties experienced have been overstated. It is also possible that their associated feelings of frustration stem from elements of their relationship rather than from communication barriers. It is only by studying actual conversations that the reported perceptions could be confirmed and couples strategies identified, showing how couples have adapted their interactions to compensate for the hearing loss.

Purpose of the Present Investigation

The present study examined the disability associated with a male hearing loss. In 1980, an impairment was considered by the World Health Organization to be "any loss or abnormality of a psychological, or anatomical structure or function," i.e., an impairment was, therefore, "a disturbance at the level of the organ." The World Health Organization defined a disability as "any restriction or inability (resulting from an impairment) to perform an activity in the manner or within the range considered normal for a human being " (WHO, 1980, p. 1). A handicap was defined as "any disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal . . . for that individual" (WHO, 1980, p. 1). This was further explained as, "a classification of circumstances that place individuals 'at a disadvantage relative to their peers when viewed from the norms of society' " (WHO, 1980, p. 1).

These definitions were revised in 1996 to provide more specific information on human functioning and disability. "Function" is organized into (a) body dimensions which include both system functions and body structures, (b) activity dimensions which cover the full range of an individual's ability to perform, (c) participation dimensions which delineate areas of life that an individual has access to and includes both societal opportunities and barriers, and (d) environmental factors that have an impact on an individual's personal and general environment (WHO, 1996). These dimensions are organized on a continuum from two poles of "no problems" to "severe problems" and are referred to as the domain of a dimension. As the factors that compose and surround an individual's personal definition of impairment, disability, and handicap become more complex, how then does this influence the spouse and family of the person with the impairment? In the instance of hearing loss, does the spouse of the person with a hearing impairment also have a disability? From the most recent definition provided by the World health Organization, the disability encompassed the spouse as it affects the communication system involving both members of the couple. Furthermore, the literature surveyed supports this view of the disability being jointly shared by the marriage partners.

The basic research question addressed in this study was "Does the disability of hearing loss change the way in which couples communicate?" Provided the answer to this question was "yes," then the study was designed to identify the way in which this change occurred.

The overall objective of this project was to investigate the manner in which interactive communication was altered in couples where the male member of the dyad experienced a hearing loss. The female spouse will be considered as a part of a couple in the group with male hearing loss and be analyzed as well to establish potential gender differences.

The results of a preliminary study, using four subject couples representing young and older age categories with hearing impaired and normal hearing abilities, indicated the increased use of directives by the females in the couples with hearing loss (Harned, 1988a, 1988b). This tentatively confirmed the reported conversational changes made by spouses. The older male with hearing impairment participated to a lesser extent in the conversation (14.8 %) than did his wife (85.2 %). This male subject also used the conversational confirmation category more than any other subject recorded. The younger male with hearing loss used the strategy of excogitation, or thinking aloud, to let his spouse know his thoughts, while excluding conversational interaction. The results of the pilot study demonstrated that a study with greater sample size, using a similar methodology, would be worthwhile to better understand how couples with hearing loss adjust their communication systems. The two environments (quiet, noise) were an added as additional

The hypotheses tested were as follows:

With the increased effort involved in communicating with a male partner having a hearing loss, it is expected that the female spouses will use the most efficient way of expressing a message, namely, the directives category. (1) Females in couples with hearing loss will demonstrate proportionally more use of directive statements than females in couples with normal hearing.

Similarly, because of the extra effort to communicate, it is predicted that the males with hearing loss will not extend a lot of effort in simple confirmations but will rather use a generic response just to keep the conversation flowing. (2) Males in couples with hearing loss will use more nonspecific confirmation statements to maintain conversational flow than will males in couples with normal hearing.

With the additional effort needed to converse with the existence of a male hearing loss, couples will use less sharing of opinions as this category is not necessary for daily functional communication. (3) Couples with hearing loss will produce fewer shared opinions, judgments, and beliefs than couples with normal hearing.

It is predicted that both groups will frequently use statements of fact and unlike “judgments,” that this category will be necessary for daily functional communications. (4) There will be no significant difference in the use of neutral information statements and requests of couples with hearing loss compared to couples without hearing loss.

For those couples with normal hearing, the initiation of topics will be jointly shared with balanced turn taking. For the couples in the group with male hearing loss, the male member with the hearing impairment will either try to control the conversation or withdraw and leave the topic responsibility for his partner. (5) The initiation of new topics will be shared by couples with normal hearing but will be skewed to one member in couples with hearing loss.

With the spousal coping strategies by the partners of men with hearing loss, outlined by Hallberg and Barrenas (1993), most of the social responsibility for promoting a “normal image” is undertaken by the wives. It is predicted that the women in the group with male hearing loss will, therefore, take greater responsibility and show greater participation during the conversation than will the women not encumbered by this concern. (6) The females in couples with hearing loss will use greater proportional talking time than the females in couples with normal hearing.

Since a noisy environment can be distracting to the comprehension of communication and may cause greater need of conversational vigilance, the use of simulated noise will add further stress to the existing communication system allowing for clearer study of stress responses during conversational attempts.
(7) Conversational performance of both groups will decline in the noise environment.

CHAPTER 2
METHODS

Subjects

A total of 40 couples participated in this study. The couples were recruited from populations at the University of Florida Health Science Center Clinic, ENT practices, church memberships, and referrals from colleagues. They were geographically located in Gainesville, Leesburg, and Lady Lake, Florida, and in Alameda and Oakland, California. All couples used English as their primary language. All participants were Caucasian.

For a couple to be considered for participation in the study, one member of the couple had to be between 55 and 75 years old. The subjects must have perceived themselves as healthy and have no awareness of any condition or of taking any medication that would alter or interfere with their ability to interact with their partner in normal conversation. While a marriage relationship was not required for eligibility to participate in this study, the couple needed to have sustained a relationship together for at least one year. Each subject had to voluntarily sign the University of Florida's research consent and release of information (IRB) form (see Appendix A).

Personal and professional colleagues referred potential couples for screening. These couples were contacted by phone, and if they met the above criteria, a meeting was scheduled at a mutually convenient time and location. Couples were initially greeted and given a brief oral explanation of the procedure for participation in the study. Every member of a couple participating in the study was asked to read the IRB voluntary consent form, and sign it. Each subject was given (a) a one-page demographic questionnaire to complete (see Appendix A), (b) a screening form of the Hearing Handicapped Inventory for the Elderly (HHIE) (Ventry & Weinstein, 1982) (see Appendix A), and (c) a hearing screen using a portable pure tone audiometer at 45 dB HL and frequencies of 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz.

For couples to qualify as subjects, the females had to score less than 12 on the HHIE and pass the pure-tone screening. Couples in which the male scored less than 12 on the HHIE and passed the hearing screen criteria were placed in the group of subjects with normal hearing (see Appendix B for HHIE scores). Couples in which the male scored 12 or greater on the HHIE and failed the hearing screen at 45 dB HL were accepted into the group of subjects with male hearing loss. Complete audiograms were then obtained on all males in this group (see Appendix B for demographic responses).

To maintain the confidentiality of the participants, subjects were assigned a subject and couple number for reference. The couples had the option to withdraw from participation at any time during the data-gathering process and to have their conversational samples deleted. Participation in this research process and the release of information was voluntary for all subjects. No subject received any payment for participation in this study.

A total of 62 subject couples were tested, but 14 couples were unable to pass the initial screening criteria because of a female hearing loss. Six couples were not eligible because an accurate audiogram was not obtained. Two couples were not included in the study due to equipment failure during the recording process.

Subject Demographics

Subject demographics were recorded relative to (a) subject age, (b) level of education (choice of eight), (c) years of marriage or relationship, (d) occupation, (e) number of activities in which they regularly participated (choice of ten), (f) perception of hearing loss, (g) estimated age of identification of male hearing loss, (h) availability of hearing aids, (i) if worn daily, and (j) previous communication training. A summary of the subject demographics can be found in Table 1 (see Appendix B for subject responses).

Female subjects had a minimum age of 48 and a maximum age of 76 years. The mean age for the females in the group with normal hearing was 58.85, and the mean for the females in the group with male hearing loss was 67.80. The overall female mean was 63.33 with a standard deviation of 7.05. Male subjects had a minimum age of 53 and a maximum age of 81. The males in the group with normal hearing had a mean age of 63.80, and the males in the group with male hearing loss had a mean age of 70.90. The mean age for the male subjects was 67.35 with a standard deviation of 6.88. All subjects (female, male) when grouped together had a mean age of 65.34 with a standard deviation of 7.21.

Table 1

Subject Demographics

	N	Age	Education > HS	Years in Relationship	Number of Activities	HHIE Scores
Normal hearing						
Female	20	58.85	14	10+	7.05	1.80
Male	20	63.80	17	10+	6.30	1.90
Hearing loss						
Female	20	67.80	10	10+	5.80	2.10
Male	20	70.90	13	10+	5.85	18.90

Thirty-one of the 40 subjects in the group having normal hearing had some college education while 23 of the subjects in the group with male hearing loss reported the same. Overall, 67.5% of the subjects had education above the high school level, and 32.5% of the subjects had advanced college degrees. The most frequent occupation reported was as a teacher or a professor, which accounted for 18.75% of the subjects.

All but one subject couple had been married for 10 or more years. Many of the subject couples were drawn from retirement neighborhoods in Florida that promote active lifestyles by offering a wide variety of activities and catering to a broad spectrum of interests.

Subjects were given 10 possible choices with a space to add other activities not listed. The total female subjects participated in a mean of 6.43 activities with a standard deviation of 2.02. Females in the group with normal hearing had a mean for activities of 7.05 while the females in the group with male hearing loss participated in a mean of 5.80 activities. The male subjects, overall, participated in activities with a mean of 6.08 and a standard deviation of 1.73. The males in the group with normal hearing had an activity mean of 6.30, and the males in the group with male hearing loss had a mean of 5.85. Overall, the mean activity level for females and males in both groups was 6.25 with a standard deviation of 1.88.

Three of the females and two of the males in the group with male hearing loss and one female in the group with normal hearing thought they had a hearing loss before they were screened, but none of these perceived hearing losses was confirmed with either the pure-tone screening or the HHIE scores. The youngest reported age for the acquired male hearing loss was at age 40, which was reported by two male subjects. Of these 20 subjects with male hearing loss, 8 had no hearing aid, and 1 reported not wearing the aid available to him. Ten of the subjects in the group with male hearing loss wore some sort of hearing augmentation during their conversational episodes. Prior communication training was reported by 17.5% of the group with normal hearing and by only 10% of the subjects in the group with male hearing losses.

The subjects reported on their perception of whether or not they thought themselves to have a hearing loss. If the male subjects had, in the past, a documented loss that had been identified, then further questions were asked as to date of hearing loss identification by age, whether or not they had hearing aids, and if the aids were worn daily. Subjects were also asked if they had any previous communication training. These responses are shown in Table 2.

Table 2

Subjects' Perception of Hearing Loss

	Hearing Loss?	Age Ident.	Aids?	Wear Daily?	Com. Train.
Normal hearing					
Females	yes 3 no 17	none	no	no	yes 2 no 18
Males	yes 2 no 18	none	no	no	yes 5 no 15
Hearing loss					
Females	yes 1 No 19	none	no	no	yes 3 no 17
Males	yes 20 no 0	59.78	12	11	yes 1 no 19

Three of the females and two of the males in the group with normal hearing thought they had a hearing loss before they were screened, but none of these perceived hearing losses were confirmed with documentation and there were no hearing aids used by any of the subjects in this group. One of the female subjects in the group with male hearing loss felt she had a hearing loss but was easily able to pass the hearing screen offered later. The subjects in the group with male hearing loss all knew that they had a hearing impairment, and all but two could offer an estimate of the age at which the hearing loss was first noticed. The youngest reported age for the acquired hearing loss was at age 40 which was reported by two male subjects. Of these 20 males, 8 had no hearing aid and 1 reported not wearing the aid available to him. Ten of the subjects in the group with male hearing loss wore some sort of hearing augmentation during their conversational episodes. Prior communication training was reported by 17.5% (7 subjects) of the group with normal hearing and by only 10% (4 subjects) of the subjects in the group with male hearing loss.

Instrumentation

Two 5-minute continuous episodes of conversations were recorded from each couple using two environmental conditions--quiet and simulated noise. Quiet was defined for the purpose of this study as the absence of distracting noise and determined by clinical judgment. The simulated noise environment was produced by using a tape of modulated white noise (ICRA, 1995) which was designed to simulate four people talking. It was played at a level of 60 dB SPL, calibrated with a Quest sound level meter. Each conversational segment was recorded on a Sony microcassette recorder, Model 717V, using TDK MC60 tape cassettes. These tapes were transcribed using a Panasonic microcassette transcriber, Model RR-930, and a footplate by Matsushita Electric Industrial Co., Model RP-2692.

During the recording on the conversational segments, couples used small microphones (Radio Shack omni-directional impedance, Model 33-3003) attached to the front of their clothing to enhance clarity and so increase the ease of transcription. A split cord was used to connect the microphones directly to the microcassette recorder. A separate electric or battery-operated Panasonic tape recorder, Model RQ-2104, was used to produce the distracting background for the conversational segment to be undertaken in noise. The following block diagram illustrates how the equipment was situated for recording (Figure 1).

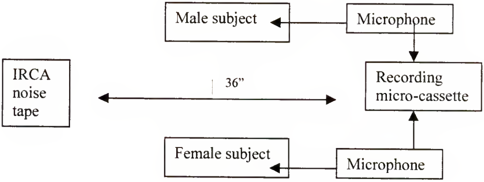


Figure 1. Block diagram of equipment location.

Data Collection Procedure

Screenings were undertaken in settings that were convenient and appropriate for the criteria of this study. These included homes, church classrooms, clinic rooms, and conference areas where a relatively quiet room or area was available. Both husbands and wives of each couple completed the UF IRB consent form, the HHIE, and the demographic form. They were then screened using a pure tone portable audiometer. If the subjects met the screening criteria, the couples were seated at a table in a separate room. The conversational task was described by the investigator and the couple was asked to begin talking. The conversations were timed and recorded. No set selection of topic themes were offered as it was decided to use the couples natural choices to maximize the speech spontaneity.

The couples were requested to participate in natural conversation under two separate conditions: (a) in a quiet environment and (b) in a noise-simulated environment using a tape of multi-talker noise. Males with hearing loss were asked to wear their hearing aids during the conversational interactions only if that was their standard practice. Each of the two conversations was audio taped for 5 minutes. The order of environmental (quiet, noise) recording was counterbalanced. Once the couple had become interactive, the leader left the room allowing the couple a nondistracting setting. Although some couples chose to talk longer than the 5-minute allotment, only the first 5 minutes of conversation in each environment were collected as data. After the two recorded conversational episodes were completed, a brief discussion of the couple's responses and observations of the experience was conducted by the interviewer.

Data Analysis

Outcome Measurements

The percentage of total talking time for each subject in each couple was tabulated for both quiet and noise environments to determine the extent of each partner's participation. Each conversational 5-minute episode was transcribed into a written script. This was subsequently analyzed by a certified speech-language clinician familiar with the communicational categories of this study. The discourse was separated into idea units rather than grammatical statements. Idea units were defined as a set of words or word-like sounds that expressed a full idea, but were not necessarily complete statements or phrases. For example, "I think we should go there" and "uh-huh" were both considered idea units. Idea units were counted by subject and by environmental condition. The idea unit was assigned to one of the seven categories of language intent used for analysis: (a) neutral information, (b) directives, (c) judgments, (d) humor, (e) confirmations, (f) exclamations, and (g) thinking aloud.

The coding conventions used were as follows: An idea unit was encoded as a neutral statement if the statement was one of fact and did not contain any judgement or persuasion. A directive was considered a command or request for action. A judgment was an opinion, a belief, or persuasive comments. Any idea units starting with, "I think" or "I feel" or containing the words "should" were considered judgments. Humor was a play on words, a silly response or a laughing response. Nonspecific confirmations were responses that were generic in nature and could be used to answer any statement. These included “yeah,” “uh-huh,” “oh,” “Mmmm,” “O.K.,” and “yep,” for example. The specific confirmations referred to the previous statement and included usually more words--“That’s right,” “I agree,” or a repetition of what the partner had said such as “So you say you will go today. . . .” Tables 3 and 4 provide additional coding information. Also see Appendix C for more samples of the encoding process.

Each idea unit was also scrutinized to determine the pattern of topic change and support during the turn taking of discourse by the couples. Topic changes and topic adaptations were measured by (a) the number of times in which a member of the couple initiated a new topic and by (b) tabulating the longest turn-taking episode number for each member of the couple where a topic introduced by one partner was maintained or supported by both members of the couple. The overall pattern of turn taking by topic activity was studied for gender influences between couples and within couples. A comparison was made between the findings of the subject groups with normal hearing and those with male hearing loss. Similarly, a comparison was made between the results obtained in quiet and in noise.

The number of times in which the conversational flow was interrupted by content breaks was tabulated. The number of episodes in which it was necessary

Table 3

CategoriesTypes

Type	Explanation
1. Neutral information:	A request or statement of fact, a query or statement without speaker bias.
2. Directives:	A request or statement that directs an action.
3. Judgment:	A request or statement that presents an opinion, a belief, a view that is held by the speaker which can, but may not be persuasive.
4. Humor:	A request or statement said in jest or with the intent to be humorous.
5. Nonspecific Confirmation:	Pertains to any response utterance without specific reference to the previous statement.
6. Specific Confirmation:	Specific pertains to and is particularly relevant to the previous statement.
7. Exclamations:	Expressions of amazement, surprise, excitement, or dismay.
8. Thinking aloud:	Talking to self that expresses the speaker but is not intended to elicit any partner response.

Table 4

Examples of Category Usage

Type	Example
1. Neutral information:	Did you say you were going to call your sister on Sunday?
2. Directive:	Call your sister!
3. Judgment:	I think you should call your sister.
4. Humor:	If you don't call your sister soon, she's going to forget you.
5. Nonspecific confirmation:	Uh-huh, yeah.
6. Specific confirmation:	Thanks for the reminder. . . . That's a good idea.
7. Exclamations:	WOW!
8. Thinking aloud:	If I call her now she probably won't be home so I will call her tonight after supper and before I go for my walk. (see Appendix B)

to repeat for comprehension was counted. The number of episodes of congruent talking by each couple was determined. As an indication of effort, the number of times in which one member of a couple would comment on or question the time remaining for recording was noted. These amounts were compared by subject groups of normal and male hearing loss acuity in environments of quiet and noise without regard to gender differences. For this measurement, couples instead of single subjects were considered because the communication breakdown events were jointly shared by both members of the couple.

Statistical Analysis

The responses to the information requested on the demographic questionnaire were tabulated and descriptive statistics were used to investigate the results. Table 1 and Table 2 summarize these subject responses (see Appendix A for demographic questionnaire and Appendix B for raw data of subject responses).

For the first and second hypotheses--(a) females in couples with male hearing loss to use more directive statements and (b) males with hearing loss to use more confirmation statements--variable value ranges were clinically estimated for the group with normal hearing and the group with hearing losses in both quiet and noise environments. A t-test power analysis was run with distribution properties which assumed that 95% of the observed values in any of the cells of a design table would fall within the anticipated value ranges and that about one-fourth of a value range would be an estimate of the standard deviation. It was also assumed that there would be a within-subject correlation of .5 between responses observed in quiet and noise and that the mean noise-quiet difference would be compared between couples with normal hearing (NL) and couples with male hearing losses (HL) using a two sample t-test. With these assumptions, there was 83% power at a two-tailed significance level of .05 to detect a NL hearing from a HL group difference in noise-quiet for female use of directive statements and greater than 99% power at a two-tailed significance level of .05 to detect a NL versus HL difference in noise-quiet for male confirmation statements. With an increase of 10% in standard deviation, the power to detect a difference in male confirmation statements still was greater than 99%, but the power to detect female use of directives was reduced to 76% which was just adequate for detecting a difference assuming a sample size of 40.

Comparisons of outcome measures between subject groups (normal hearing, male hearing loss), gender (female, male), and environments (quiet, noise) were completed. A three-way analysis of variance (ANOVA) was used to detect significance of main effects and interactions of measures of participation, percentage of talking time and generation of idea units and communication intent category usage. A two-way ANOVA was run to determine significance of main effects and interactions on topic pattern measurements of most topics initiated and longest supported episode and on elements of communication breakdown, which included amount of congruent talking, content breaks, repetitions, and time comments. Appropriate follow-up and descriptive analyses were also determined.

To evaluate interjudge reliability, 10% of the conversations of each subject group were re-transcribed by an independent transcriptionist. These were then re-timed, and re-encoded by a separate investigator who had been trained by the primary clinician of the study. Interjudge reliability was analyzed using Pearson product-moment correlation to determine the percentage of difference.

CHAPTER 3
RESULTS

This chapter reports the results of the descriptive and statistical analyses done on the conversational samples of elderly married couples. The data were collected from 40 older married couples aged 55-75 years and divided into two groups by level of male hearing acuity. Conversational samples were recorded in two contiguous time segments, 5 minutes in quiet and 5 minutes in a noise-simulated environment. Results are presented in four sections: (a) degree of participation relative to the generation of idea units and degree of participation measured as a percent of talking time, (b) categories of communication intent, (c) topic patterns, and (d) elements of communication breakdown. Each utterance that formed a complete thought, termed idea unit, was counted. The percentage of talking time for each subject was calculated in comparison to the total talking time used by a couple in each environment. Conversations were encoded into six categories of conversational intent. Topic patterns were examined by tabulating the number of topics initiated by each member of the couple in each environment. The longest supported episode of a topic was determined for each participant of the couple for additional information on topic patterns. Conversational breakdown was measured by calculating the number of content breaks which occurred for each couple in each environment, the number of times conversational repetition was used, and the number of episodes of congruent talking. The number of times that a couple commented upon the passing of time during their conversation was also noted as an indication of the amount of effort the couple extended for completing the conversational tasks. The elements of communication breakdown were calculated as measures of effort to provide supporting information for the hypotheses based on the exertion of greater effort by couples in the group with male hearing loss. The conversational samples were transcribed and analyzed by the principal researcher. A librarian trained by the researcher performed analysis for interjudge reliability on 10% of the data. Findings are reported in a final section of this chapter (see Appendix E for raw data).

Subject Demographics

As noted in Table 1, there appears to be a difference between the two groups found in the means for age and number of subjects with higher education. The group with male hearing loss was older (x= 69.35) than the group with normal hearing (x= 61.33). A student t-test was completed and a comparison of 0.097 was found, which was not significant (p>.05). Similarly, a student t-test for comparison of differences in the number of subjects with a college level education (group with normal hearing x= 15.5, group with male hearing loss x= 11.5) was completed at 0.20 and found not to be significant (p>.05).

Conversational Participation

Participation as Measured by the Generation of Idea Units

Each subject's participation was measured relative to two factors: (a) generation of idea units and (b) percentage of talking time. Mean values were reported by gender, hearing status (normal or impaired), and conversational environment (quiet or noise).

An idea unit was defined as an utterance that contained a complete message. For example, a complete sentence, or an expression such as "uh-huh," counted as one idea unit. Table 5 shows the means and standard deviations for the number of idea units. A three-way analysis of variance was run to test for effects of gender, groups and environments on the number of idea units. No significant interactions were found, but main effects for significant differences in groups ($p \leq .05$) and in environments ($p \leq .01$) were confirmed. The number of idea units generated was significantly higher for the group with normal hearing than the group with hearing impairment across genders and environments. Significantly ($p \leq .01$) more idea units were produced in quiet than in noise across both groups and genders. No significant differences were found between genders.

Participation as Measured by the Percentage of Talking Time

The amount of time each subject spent talking was tabulated during the transcription process. Talking time was reported as a percent of the total talking time of the couple in quiet and in noise environments respectively. The means

Table 5

Idea Units

	Quiet	Noise
NORMAL HEARING		
Females		
Means	64.55	49.45
Standard Deviation	26.66	20.48
Males		
Means	54.40	44.95
Standard Deviation	18.65	20.88
HEARING LOSS		
Females		
Means	52.15	42.15
Standard Deviation	21.26	11.04
Males		
Means	49.70	41.05
Standard Deviation`	18.61	11.37

ANOVA of Idea Units by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	7605.944	7	1086.563	2.853	.008
GROUP	1482.306	1	1482.306	3.892	.050*
GENDER	1226.556	1	1226.556	3.221	.075
ENVIR.	3851.406	1	3851.406	10.113	.002**
2-Way Interactions					
GROUP GENDER	566.256	1	566.256	1.487	.225
GROUP ENVIR.	9.506	1	9.506	.025	.875
GENDER ENVIR.	299.756	1	299.756	.787	.376
3-Way Interactions					
GROUP/GENDER/ENVIR.	170.156	1	170.156	.447	.505
Error	57886.050	152	380.829		
Total	454469.000	160			
Corrected Total	65491.994	159			

*significant $p \leq .05$

**significant $p \leq .01$

and standard deviations for the percentage of talking time are presented in Table 6. Statistical analysis in the form of an analysis of variance (ANOVA) was completed using the model of 80 subjects in two groups (normal hearing, male hearing loss), in two genders (female; male), and in two environments (quiet, noise). Results of this 3-way ANOVA showed a significant interaction of gender and group ($p \leq .05$). Due to the significant interaction, the main effects for gender and group were not considered. No significant main effect for environment or other interactions were found. Appropriate post hoc procedures were completed testing the significance of the interaction of gender-group, looking at the differences (Least Squares Means) of gender and group averaged over the effects of environment. Significance was found for females in the group with normal hearing ($p \leq .01$) in comparison to the males in the group with normal hearing regardless of environmental conditions. No significance was found for females or males in the group with male hearing loss.

Categories of Communicational Intent

Communicational intent was encoded in the eight categories of (a) neutral statements, (b) judgments, (c) directives, (d) humor, (e) nonspecific confirmations, (f) specific confirmation, (g) thinking aloud, and (h) exclamations. Six of the eight categories were analyzed for patterns of significance (see Appendix C for samples of encoding).

Table 6

Percentage of Talking Time for Participants

	Quiet	Noise
NORMAL HEARING		
Females		
Mean	55.27	56.08
Standard Deviation	11.50	20.15
Males		
Mean	44.73	43.92
Standard Deviation	11.50	20.16
HEARING LOSS		
Females		
Mean	52.09	49.36
Standard Deviation	14.66	13.23
Males		
Mean	47.91	50.64
Standard Deviation	14.66	13.23

ANOVA of % Talking Time by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	3090.822	7	441.546	1.894	0.074
GROUP	15.606	1	15.606	0.067	0.796
GENDER	1489.204	1	1489.204	6.386	0.013*
ENVIR.	0.436	1	0.436	0.002	0.966
2-Way Interactions					
GROUP GENDER	1346.817	1	1346.817	5.776	0.017**
GROUP ENVIR.	5.951	1	5.951	0.026	0.873
GENDER ENVIR.	50.635	1	50.635	0.217	0.642
3-Way Interactions					
GROUP/GENDER/ENVIR.	103.398	1	103.398	0.443	0.506
Error	35444.801	152	233.189		
Total	437456.351	160			
Corrected Total	38535.6224	159			

*significant $p \leq .05$

**significant $p \leq .05$

Table 6--continued.

Post Hoc Testing of the Interaction of gender*group.

Effect	Num DF	Den DF	F Value	Pr > F
envir	1	76	0.00	0.9656
gender	1	76	6.39	0.0136 *
group	1	76	0.07	0.7966
envir*gender	1	76	0.22	0.6426
envir*group	1	76	0.03	0.8735
gender*group	1	76	5.78	0.0187 **
envir*gender*group	1	76	0.44	0.5075

Least Squares Means

Standard

Effect	gender	group	Estimate	Error
gender*group	1	0	55.6563	2.4145
gender*group	1	1	50.4750	2.4145
gender*group	2	0	43.7445	2.3563
gender*group	2	1	50.1758	2.4772

Differences of Least Squares Means (unadjusted for multiple comparisons)

Effect	(gen/gp)-(gen/gp)		Diff.	Stand. Error	Unadj P
gender*group	1/0	1/1	5.1812	3.4146	0.1333
gender*group	1/0	0/2	11.9117	3.3737	0.0007*
gender*group	1/0	2/1	5.4805	3.4592	0.1173
gender*group	1/1	2/0	6.7305	3.3737	0.0496**
gender*group	1/1	2/1	0.2992	3.4592	0.9313
gender*group	2/0	2/1	-6.4313	3.4189	0.0638

Table 6--continued.

Differences of Least Squares Means (Tukey-adjusted for multiple comparisons)

Effect	(gen/gp)-(gen/gp)		Diff.	Stand. Error	Adj P
gender*group	1/0	1/1	5.1812	3.4146	0.4323
gender*group	1/0	2/0	11.9117	3.3737	0.0039***
gender*group	1/0	2/1	5.4805	3.4592	14.5672
gender*group	1/1	2/0	6.7305	3.3737	15.5925
gender*group	1/1	2/1	0.2992	3.4592	0.9998
gender*group	2/0	2/1	-6.4313	3.4189	0.2448

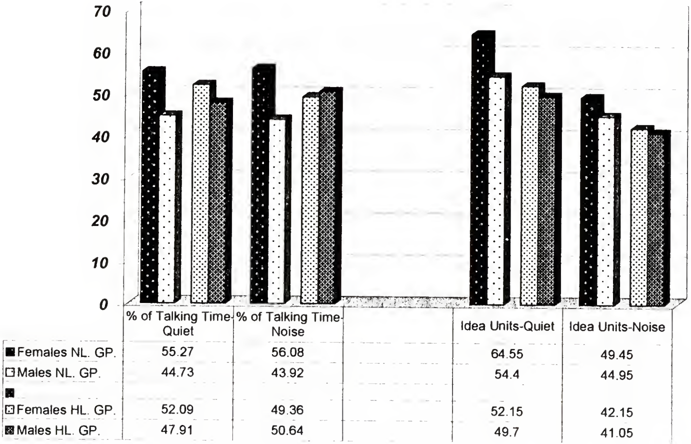
* significant p≤ .01

** significant p≤ .05

* significant p≤.001

** significant p≤.05

*** significant p≤.01



	% of Talking Time-Quiet	% of Talking Time-Noise		Idea Units-Quiet	Idea Units-Noise
■ Females NL. GP.	55.27	56.08		64.55	49.45
☐ Males NL. GP.	44.73	43.92		54.4	44.95
▨					
⊡ Females HL. GP.	52.09	49.36		52.15	42.15
▩ Males HL. GP.	47.91	50.64		49.7	41.05

Figure 2. Participation chart.

Neutral Statements

The "neutral" category describes statements and questions that do not hold any bias from the speaker. This category often relates a fact or a piece of information. Table 7 shows the means and standard deviations for the use of neutral statements. The "neutral information" category was analyzed using a three-way analysis of variance by group (normal hearing, male hearing loss), gender (female, male), and environment (quiet, noise). Significance ($p \leq .05$) was found for environmental differences such that more neutral statements were used in quiet than in the noise environment across genders and groups. Significance ($p \leq .001$) in the main effects for group differences denoted greater use of neutral statements by couples in the group with normal hearing in comparison to couples in the group with male hearing loss across genders and environments. No significant differences were found between genders. No significant interactions were identified in this category.

Directives

The "directives" category refers to specific commands and direct requests. This category was less frequently used than some of the other categories of communicational intent. Table 8 provides the means and standard deviations for the use of directives in the conversations. A 3-way ANOVA showed significant main effects in the use of "directives" by gender ($p \leq .01$) and for subject groups ($p \leq .05$). Women used significantly ($p \leq .01$) more directives than did men across both groups and environments. Those in the group with male hearing loss used

Table 7

Neutral Information

	Quiet	Noise
NORMAL HEARING		
Females		
Means	19.30	15.65
Standard Deviation	9.30	5.68
Males		
Means	17.90	14.15
Standard Deviation	7.99	6.26
HEARING LOSS		
Females		
Means	13.05	10.70
Standard Deviation	9.05	4.86
Males		
Means	11.50	10.60
Standard Deviation	5.74	5.16

ANOVA of “Neutral Information” by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	1552.725	3	517.575	10.728	.000
ENVIR.	297.025	1	297.025	6.156	.014*
GENDER	67.600	1	67.600	1.401	.238
GROUP	1188.100	1	1188.100	24.625	.000**
2-Way Interactions	63.825	3	21.275	.441	.724
ENVIR. GENDER	6.400	1	6.400	.133	.716
ENVIR GROUP	48.400	1	48.400	1.003	.318
GENDER GROUP	9.025	1	9.025	.187	.666
3-Way Interactions	4.225	1	4.225	.088	.768
ENVIR. GENDER GROUP	4.225	1	4.225	.088	.768
Corrected total	1620.775	7	231.539	4.799	.000
Error	7333.600	152	48.247		
Total	8954.375	159	56.317		

* Significant $p \leq .05$

** Significant $p \leq .001$

Table 8
Directives

	Quiet	Noise
NORMAL HEARING		
Females		
Means	4.60	4.20
Standard Deviation	5.05	4.99
Males		
Means	3.75	3.30
Standard Deviation	3.97	3.96
HEARING LOSS		
Females		
Means	8.20	6.85
Standard Deviation	6.04	5.45
Males		
Means	5.00	3.55
Standard Deviation	3.97	4.87

ANOVA of “Directives” by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	363.119	3	121.040	5.142	.002
ENVIR.	41.006	1	41.006	1.742	.189
GENDER	187.056	1	187.056	7.947	.005**
GROUP	135.056	1	135.056	5.738	.018*
2-Way Interactions	53.469	3	17.823	.757	.520
ENVIR. GENDER	.156	1	.156	.007	.935
ENVIR. GROUP	6.006	1	6.006	.255	.614
GENDER GROUP	47.306	1	47.306	2.010	.158
3-Way Interactions	.506	1	.506	.022	.884
ENVIR. GENDER GROUP	.506	1	.506	.022	.884
Corrected Total	417.094	7	59.585	2.531	.017
Error	3577.850	152	23.538		
Total	3994.944	159	25.125		

** Significant $p \leq .01$

* Significant $p \leq .05$

more directives in their conversations than couples in the group with normal hearing across genders and environments. No significance was found in interactions or for environments.

Humor

The "humor" category included statements that at least one member of the couple found amusing and was often followed by laughter. Table 9 provides the means and standard deviation values for the use of the humor in the conversations. A 3- way analysis of variance model was used for analyzing the "humor" category. Results showed significance between the two subject groups ($p \leq .05$) only. The group with male hearing loss used more instances of humor than was used by the group with normal hearing across genders and environments. Results showed no significant main effects for gender or environment. Similarly, there were no significant interaction effects between the three factors of gender, group and environment.

Confirmations

The "confirmation" category was divided into two types--specific responses and nonspecific responses--for purposes of conversational intent analysis. It is the nonspecific category that is of importance in this study.

Nonspecific confirmations

"Nonspecific confirmations" are general in nature and may be used as a response to comments and topics. Examples of nonspecific responses include "uh-huh," "Yeah," "Mmmm," and "Okay." The means and standard deviations of

Table 9

Humor

	Quiet	Noise
NORMAL HEARING		
Females		
Means	.70	.75
Standard Deviation	1.22	1.21
Males		
Means	1.10	1.00
Standard Deviation	2.15	1.97
HEARING LOSS		
Females		
Means	1.60	1.55
Standard Deviation	1.79	1.90
Males		
Means	2.00	1.50
Standard Deviation	2.38	1.82

ANOVA of "Humor" by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	22.669	3	7.556	2.299	.080
ENVIR.	1.806	1	1.806	.549	.460
GENDER	3.306	1	3.306	1.006	.318
GROUP	17.556	1	17.556	5.341	.022*
2-Way Interactions	2.169	3	.723	.220	.882
ENVIR. GENDER	.306	1	.306	.093	.761
ENVIR. GROUP	1 .806	1	1.806	.549	.460
GENDER GROUP	.056	1	.056	.017	.896
3-Way Interactions	.006	1	.006	.002	.965
ENVIR. GENDER GROUP	.006	1	.006	.002	.965
Corrected Total	24.844	7	3.549	1.080	.379
Error	499.650	152	3.287		
Total	524.494	159	3.299		

*Significant $p \leq .05$

category usage are provided in Table 10. A 3-way analysis of variance was used to examine "nonspecific confirmation" speech. Results showed significance between subject groups ($p \leq .001$) indicating greater use of nonspecific confirmations by couples in the group with normal hearing across both genders and environments. Significance for the main effects of environment ($p \leq .01$) was found with more nonspecific confirmations produced in the quiet environment by both groups and in the two environments. No significance was found for any interactions or for the main effect of gender.

Specific Confirmations

"Specific confirmations" referred to comments that pertained directly to preceding expressions. Examples of this type of response include the following: "You noticed that?" "I'm sure you are right." "I'll agree with you if you feel strongly about it." This category was used by most of the participants in the study. Table 11 displays the means and standard deviation values for this category. A 3-way ANOVA was performed by group, gender, and environment. No significance was found in the main effects or interactions for this category ($p > .05$).

Judgments

The category of "judgments" includes expressions of feeling, beliefs, views, opinions, and persuasive speech. This category was used frequently by all participants in the study. Table 12 shows the means and standard deviations of category usage. Results of a three-way ANOVA showed no significance for the

Table 10

Nonspecific Confirmations

	Quiet	Noise
NORMAL HEARING		
Females		
Mean	14.75	9.65
Standard Deviation	8.17	5.99
Males		
Mean	11.50	9.25
Standard Deviation	7.32	7.27
HEARING LOSS		
Females		
Means	7.30	5.85
Standard Deviation	4.99	3.30
Males		
Mean	10.25	6.30
Standard Deviation	10.41	4.91

ANOVA of "Nonspecific Confirmations" by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	906.369	3	302.123	6.359	.000
ENVIR.	369.056	1	369.056	7.768	.006*
GENDER	.756	1	.756	.016	.900
GROUP	536.556	1	536.556	11.294	.001**
2-Way Interactions	102.369	3	34.123	.718	.543
ENVIR. GENDER	.156	1	.156	.003	.954
ENVIR. GROUP	4.556	1	4.556	.096	.757
GENDER GROUP	97.656	1	97.656	2.056	.154
3-Way Interactions	56.406	1	56.406	1.187	.278
ENVIR. GENDER GROUP	56.406	1	56.406	1.187	.278
Corrected Total	1065.144	7	152.163	3.203	.003
Error	7221.350	152	47.509		
Total	8286.494	159	52.116		

* Significant $p \leq .01$

**Significant $p \leq .001$

Table 11

Specific Confirmations

	Quiet	Noise
NORMAL HEARING		
Females		
Means	6.65	5.35
Standard Deviation	5.32	4.64
Males		
Means	6.85	5.40
Standard Deviation	4.79	4.85
HEARING LOSS		
Females		
Means	6.70	5.15
Standard Deviation	4.29	3.13
Males		
Means	5.60	6.50
Standard Deviation	4.66	3.80

ANOVA of "Specific Confirmation" by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	32.225	3	10.742	.543	.653
GENDER	.000	1	.000	.000	1.00
ENVIR.	30.625	1	30.625	1.549	.215
GROUP	1.600	1	1.600	.081	.776
2-Way Interactions	27.125	3	9.042	.457	.713
GENDER ENVIR.	14.400	1	14.400	.728	.395
GENDER GROUP	.625	1	.625	.032	.859
ENVIR. GROUP	12.100	1	12.100	.612	.435
3-Way Interactions	15.625	1	15.625	.790	.375
GENDER ENVIR. GROUP	15.625	1	15.625	.790	.375
Corrected Total	74.975	7	10.711	.542	.802
Error	3005.800	152	19.775		
Total	3080.775	159	19.376		

Table 12

Judgments

	Quiet	Noise
NORMAL HEARING		
Females		
Means	17.15	12.65
Standard Deviation	8.73	6.23
Males		
Means	12.35	12.05
Standard Deviation	6.11	7.20
HEARING LOSS		
Females		
Means	14.15	11.90
Standard Deviation	8.20	6.75
Males		
Means	14.60	12.35
Standard Deviation	7.56	5.35

ANOVA of “Judgments” by Group, Gender, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	211.250	3	70.417	1.387	.249
ENVIR.	164.025	1	164.025	3.232	.074
GENDER	40.000	1	40.000	.788	.376
GROUP	7.225	1	7.225	.142	.706
2-Way Interactions	138.125	3	46.042	.907	.439
ENVIR. GENDER	22.500	1	22.500	.443	.507
ENVIR. GROUP	.025	1	.025	.000	.982
GENDER GROUP	115.600	1	115.600	2.278	.133
3-Way Interactions	40.000	1	40.000	.788	.376
ENVIR. GENDER GROUP	40.000	1	40.000	.788	.376
Corrected Total	389.375	7	55.625	1.096	.369
Error	7714.400	152	50.753		
Total	8103.775	159	50.967		

main effects of gender, subject group, or environmental differences. No interactions among gender, group and environment were noted (p > .05).

Thinking Aloud and Exclamations

The remaining two categories--"exclamation," which expresses emotion, and "thinking aloud," where one talks to oneself in the presence of the spouse--were not used frequently enough by the subjects to provide sufficient data for analysis. Exclamations were used, on average, between 1 and 4 times by subjects in both groups (Table 13). It is noted that the "thinking aloud" category was only used once by the group with normal hearing (Table 14).

Table 13

Exclamations

	Quiet	Noise
NORMAL HEARING		
Females		
Means	1.88	4
Standard Deviation	1.46	4.55
Males		
Means	2.5	3.5
Standard Deviation	0.71	0.71
HEARING LOSS		
Females		
Means	4	1.33
Standard Deviation	3.16	0.58
Males		
Means	3.76	1
Standard Deviation	0.58	1

Table14

Thinking Aloud

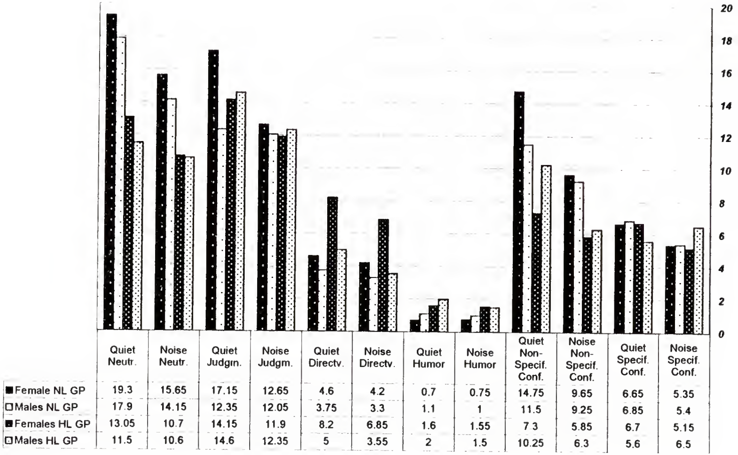
	Quiet	Noise
NORMAL HEARING		
Females		
Means	1	0
Standard Deviation	1.42	0
Males		
Means	0	0
Standard Deviation	0	0
HEARING LOSS		
Females		
Means	0	3.5
Standard Deviation	0	0.71
Males		
Means	0	0
Standard Deviation	0	0

Topic Patterns

Even though two environments (quiet, noise) divided the conversations, the couples actually talked continuously for 10 minutes. Topic patterns extended throughout the two timed periods. Therefore, the data analysis for topic patterns could not be accurately divided into quiet and noise parameters.

Number of Topics Initiated

The number of topics initiated by each member of the couple was counted as an indication of which member within the couple assumed responsibility for maintaining the conversation. Table 15 shows the means and standard deviations for the number of initiated topics. A two-way ANOVA was run to examine the effect of group (normal hearing, male hearing loss) and gender



	Quiet Neutr.	Noise Neutr.	Quiet Judgm.	Noise Judgm.	Quiet Directv.	Noise Directv.	Quiet Humor	Noise Humor	Quiet Non-Specif. Conf.	Noise Non-Specif. Conf.	Quiet Specif. Conf.	Noise Specif. Conf.
■ Female NL GP	19.3	15.65	17.15	12.65	4.6	4.2	0.7	0.75	14.75	9.65	6.65	5.35
□ Males NL GP	17.9	14.15	12.35	12.05	3.75	3.3	1.1	1	11.5	9.25	6.85	5.4
■ Females HL GP	13.05	10.7	14.15	11.9	8.2	6.85	1.6	1.55	7.3	5.85	6.7	5.15
□ Males HL GP	11.5	10.6	14.6	12.35	5	3.55	2	1.5	10.25	6.3	5.6	6.5

Figure 3. Categories of communicational intent by group, gender, and environment.

Table 15

Topics Initiated

	Means	Standard Deviation
NORMAL HEARING		
Females	4.65	3.15
Males	3.65	2.11
HEARING LOSS		
Females	4.90	2.45
Males	3.25	2.15

ANOVA of Topics Initiated by Group, and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	35.225	2	17.613	2.820	.066
GROUP	.113	1	.113	.018	.894
GENDER	35.113	1	35.113	5.622	.020*
2-Way Interactions	2.113	1	2.113	.338	.563
GROUP GENDER	2.113	1	2.113	.338	.563
Corrected Total	37.337	3	12.446	1.993	.122
Error	474.650	76	6.245		
Total	511.988	79	6.481		

*Significant $p \leq .05$

(female, male) on topic initiation patterns. A significant main effect was found for gender ($p \leq .05$). Females initiated more topics than the male participants, in both groups and across both environments. No significance was shown for interactions or for the main effect of group.

Longest Supported Episode

As a measure of topic support by the two partners, the longest episode of turn taking on a single topic was tabulated for each member of a couple. In the group with normal hearing, the females averaged 26 turns on a single topic, and the males reached a close 25.75 turns. In the group with male hearing loss, the females averaged 45.45 turns and the males 36.15 turns on their longest topic episode. These means and the standard deviations are shown in Table 16. A two-way analysis of variance showed a significant main effect for group differences ($p \leq .001$). The group with male hearing loss had longer supportive topic episodes than the group with normal hearing across gender. The interaction showed no significance.

Elements of Communication Breakdown

Four measures were calculated to provide an indication of conversational difficulty and effort faced by the couples during their recorded episodes. Occurrences of congruent talking, where both members of the couple spoke simultaneously; the number of breaks in content; the number of times repetition was used to facilitate comprehension; and the number of times a couple commented on the passing of time within the two 5-minute recorded segments of conversation were tabulated. Table 17 shows the means and standard deviations for occurrences of communication breakdown. These were divided into performances in quiet and in noise environments for each couple. The conversational samples of 40 couples, divided into two groups and two

Table 16

Longest Supported Episode

	Means	Standard Deviation
NORMAL HEARING		
Females	26.00	11.72
Males	25.75	13.04
HEARING LOSS		
Females	45.45	27.11
Males	36.15	23.94

ANOVA of the Longest Supported Episode by Group and Environment

Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects	4911.125	2	2455.563	6.079	.004
GROUP	4455.113	1	4455.113	11.028	.001*
GENDER	456.012	1	456.012	1.129	.291
2-Way Interactions	409.512	1	409.512	1.014	.317
GROUP GENDER	409.512	1	409.512	1.014	.317
Corrected Total	5320.637	3	1773.546	4.390	.007
Error	30701.250	76	403.964		
Total	36021.888	79	455.973		

*Significant $p \leq .001$

environments, were analyzed using four two-way ANOVAs. The couples were considered a conversational team for this analysis, and gender differences were not delineated (see Appendix D for samples of conversational breakdown and Appendix E for raw data). Significant differences in main effects were found for content breaks ($p < .05$), the need for repetition ($p < .001$) and for comments

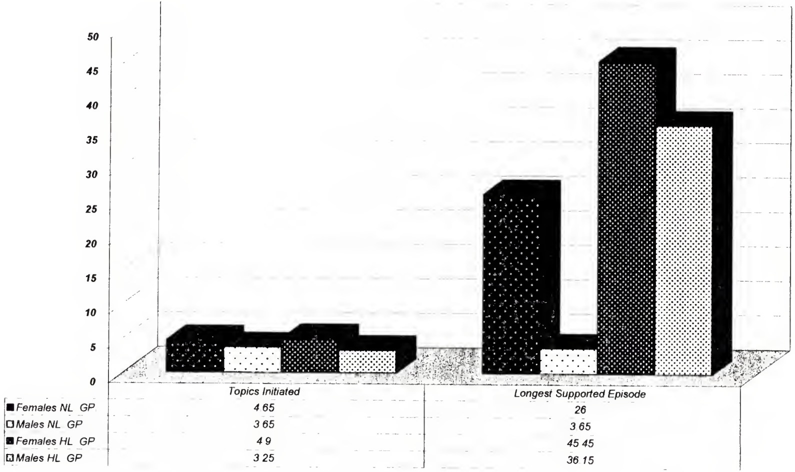


Figure 4. Topic initiation and longest supported episode.

Table 17

Elements of Conversational Breakdown

	Quiet	Noise
Congruent Talking		
NORMAL HEARING		
Mean	10.15	7
Standard deviation	4.31	5.28
HEARING LOSS		
Mean	9	7.6
Standard Deviation	7.09	5.44
Content Breaks		
NORMAL HEARING		
Mean	0.55	0.65
Standard Deviation	0.83	1.27
HEARING LOSS		
Mean	1.15	1.15
Standard Deviation	0.99	1.18
Repetitions		
NORMAL HEARING		
Mean	1	1.7
Standard Deviation	1.03	2.87
HEARING LOSS		
Mean	4.8	4.45
Standard Deviation	4.84	3.83
Time Comments		
NORMAL HEARING		
Means	0.67	0.67
Standard Deviation	0.58	0.58
HEARING LOSS		
Means	1.8	2.8
Standard Deviation	1.10	3.03

Table 17--continued.

ANOVA of Elements of Conversational Breakdown					
Source of Variation	Sum of Squares	DF	Mean Square	F	Signif. of F
Main Effects					
Congr.	120.338	3	40.113	1.270	0.291
Breaks	6.15	3	2.05	1.758	0.162
Repet.	220.638	3	73.546	6.208	0.001
Time Com.	5.9	3	1.967	1.732	0.168
GROUP					
Congr.	1.513	1	1.513	0.048	0.827
Breaks	6.05	1	6.05	5.190	0.026*
Repet.	214.513	1	214.513	18.107	0.000**
Time Com.	5	1	5	4.403	0.039***
ENVIR.					
Congr.	103.513	1	103.513	3.276	0.074
Breaks	0.05	1	0.05	0.043	0.836
Repet.	0.613	1	0.613	0.052	0.821
Time Com.	0.45	1	0.45	0.396	0.531
2-Way Interactions					
GROUP ENVIR.					
Congr.	15.313	1	15.313	0.485	0.488
Breaks	0.05	1	0.05	0.043	0.836
Repet.	5.513	1	5.513	0.465	0.497
Time Com.	0.45	1	0.45	0.396	0.531

Table 17--continued.

Error				
Congr.	2401.35	76	31.597	
Breaks	88.6		76	1.166
Repet.	900.35	76	11.847	
Time Com.	86.3		76	1.136
Total				
Congr.	8217	80		
Breaks	156	80		
Repet.	1835	80		
Time Com.	102	80		
Corrected Total				
Congr.	2521.688	79		
Breaks	94.75	79		
Repet.	1120.988	79		
Time Com.	92.2	79		

*significant $p \leq .05$

**significant $p \leq .001$

***significant $p \leq .05$

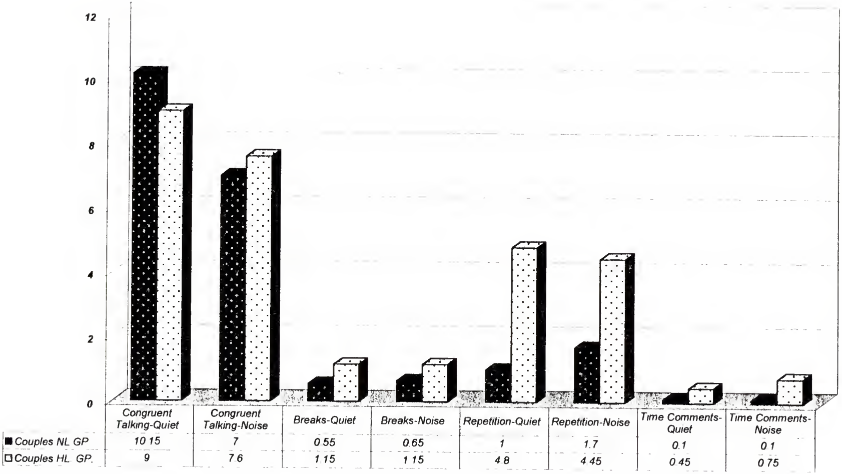


Figure 5. Elements of conversational breakdown.

made on the passage of time ($p < .05$) between groups. The group with male hearing loss experienced more content breaks, more need for repetition, and made more time comments than did the couples in the group with normal hearing across environments. There was no significance found in the data analyzed for differences in congruent talking. No significance was found for the main effect of environment or for the interaction for any of the dependent variables.

Interjudge Reliability

An independent transcriptionist transcribed the conversations of two couples from each group (normal hearing, male hearing loss) at a later date. The couples chosen were the first two couples who were audiotaped in each group. The scripts were re-timed and re-encoded by a librarian who had been trained by the research investigator. Pearson product-moment correlations were completed between the researcher's and the trained librarian's scores for category encoding and percent of talking time. Correlations of 0.948 for encoding and 0.963 for timing were calculated. These correlations are interpreted as an indication of excellent interjudge reliability.

Summary

Findings of participation indicated significance of greater idea unit generation by couples in the normal hearing group ($p \leq .05$). Significantly more idea units were generated in the quiet environment ($p \leq .01$). Women in the group with normal hearing used significantly more talking time (group & gender interaction $p \leq .01$). Communicational intent categories, neutral statements, and nonspecific confirmations were significantly more used by those in the group with normal hearing ($p \leq .001$). Neutral statements were more significantly used in quiet ($p \leq .05$, $p \leq .01$). Categories of directives and humor were significantly more used by those in the group with male hearing loss ($p \leq .01$, $p \leq .05$). Directives were used significantly more by women ($p \leq .01$). Topics for conversation were significantly more often initiated by women ($p \leq .05$) and supported the longest by couples in the group with male hearing loss ($p \leq .001$). Couples used congruent talking without distinction to gender, group or environment. The group with male hearing loss experienced significantly more conversational interruptions (content breaks $p \leq .05$, repetition $p \leq .001$) and made more comments on time parameters of the recordings ($p \leq .05$).

CHAPTER 4
DISCUSSION

Subject Demographics

Subject responses on the demographic questionnaire indicated the women and men in the group with male hearing loss were older than their counterparts in the group with normal hearing. Although the study inclusion criteria was for one member of a couple to be within the age range of 55 to 75 years old, both male and female participants in both groups averaged within this age parameter. The group with male hearing loss had a lower level of education than the group with normal hearing. Comparison student t-tests results did not show significant differences for either age or education level between the two subject groups (p>.05). The single representation within the two groups for race the lack of socioeconomic diversity and the limited geographic parameters negatively influenced the generalizability of the findings

This study was designed to investigate and ascertain differences that could be identified between conversations of older adult couples with normal hearing and conversations of older adult couples having male hearing loss under stressed and unstressed noise conditions. This study found significant differences in the structure of the conversations, the participation format, topic patterns, and interactive conversation flow of older couples dealing with the stress of hearing loss.

Participation

The amount of participation was measured for each subject in two ways. The first measure was the tabulation of talking time. The talking time of each member of a couple was timed and compared to the total amount of talking time used by each couple. Couples varied as to how much time was actually spent conversing within the five minutes of each of the two recorded conversation segments. The second measure of participation was a count of the number of idea units generated by each member of the couple. Soskin and John (1963) explained the concept of using idea units as a method to contain the irregular patterns found in spontaneous speech for content analysis. An idea unit was defined as words or sounds that provide a whole thought and are not determined by length of utterance, syntax, or grammar. These two measures, time talking and idea unit production, do not examine the same component of participation. The measure of talking time is related to but separate from the production of idea units. For example, a subject might, as a rapid speaker, use less time talking and still produce the same number of idea units as their spouse, or a subject might use the same amount of time as his spouse but produce fewer idea units as a result of speaking with a slow drawl. One who produces short idea units, such as "uh-huh," might use less time while still generating an equal number of idea units as his partner. The rate of speech and the length of nonspeech pauses, or transitions, yielded a range in the amount of data content from couple to couple.

Percentage of Talking Time

Women in the group with normal hearing were noted to have been the most talkative speakers in comparison to their husbands and to the women and men in the group with male hearing loss regardless of environmental condition. Women and men in the group with male hearing loss showed no significance for gender and the means for this group indicate a more shared use of talking time. One explanation for these group and gender differences is that the women with normal hearing were more comfortable in their leadership in spontaneous speech while those in the group with male hearing loss were more accommodating to one another.

There are probably multiple factors determining how a couple decides the way in which their interactive communications will be conducted. Factors such as conversational style, situational differences and, cohort effects may all have influenced these findings. Almost all of the couples in this study had been married for at least 10 years. In this time, they may have developed communication roles that suit their individual relationship. The women may feel more comfortable being the conversational leader in spontaneous speech situations or social situations. The two groups of women had hearing within the normal range for this study, were recruited from similar communities, and were of comparable ages. Yet, their talking times in the unstressed environment were significantly different. This may be a form of accommodation made by the women in the group with male hearing loss to their husbands' declining ability to hear.

The majority of literature reviewed on studies of gender roles in language did not support our findings of women as the most active talker (Bing & Bergvall, 1996; Coates, 1994; Crawford, 1995; Graddol & Swann, 1989; Key, 1996; Phillips et al. 1987). Traditionally, women have taken the more submissive position in conversational interactions. Crawford (1995), however, stated that women have become increasingly more assertive in their communication exchanges. Key (1996) added that women's comfort in conversation depends upon the subject matter being discussed, as topics reflect male-female patterns. Topics of conversation that are within the lexical and vocabulary domain of women (home, family, etc.) will prompt more equal conversational participation by the women. Coates (1994) reported that the designated cooperative style for women has in the past been viewed as unassertive, timid, or weak and is now in the process of being redefined as promoting good social relations and facilitating conflict resolution. In this study women were in a home environment which would have increased their comfort in discussing topics of family and home. Women were also in a cooperative, supportive role as voluntary participants. These factors may have had an influence upon the increased percentage of talking time by women with husbands having normal hearing.

Idea Units

In the second measure of participation, idea unit production, it was found that both groups produced more idea units in quiet than in noise; however, the group with normal hearing produced more units in both environments than did the group with male hearing loss. Pichora-Fuller (1997) has studied older adults with regard to language comprehension. Her research indicates that the ability to comprehend language is dependent upon several sorts of skills, both physical and cognitive. Language and speech-processing ability, clarity of memory, and the ability to sustain an attention span are mentioned, along with hearing sensitivity, as factors influencing conversational comprehension. An environment of noise would have been distracting and would have necessitated greater recruitment of resources for language comprehension for both groups of older adults. This was seen in Table 5, where the performance of both groups declined with the onset of noise. The group with male hearing loss, who regularly experience the stress placed on their conversations by the hearing loss, was less affected by the noise than the group with normal hearing. Perhaps the on-going strategies used by the group with male hearing loss served to accommodate the additional stress from the noise environment.

Categories

The categories of communicational intent that were used in the content analysis of this study were developed by Soskin and John (1963) and used to explore the personal style of a couple through listening to their spontaneous speech. Markel (1998) reviewed the dated system, giving the different categories more current labels and generalizing the system to a broader scope of usefulness. The categories were further adapted for use in this study relative to the usage patterns obtained in a previously completed pilot study. Categories for content analysis used in this study included (a) neutral statements, (b) judgments, (c) directives, (d) humor, (e) nonspecific confirmations, (f) specific confirmations, (g) thinking aloud, and (h) exclamations. The last two categories, thinking aloud and exclamations, were not statistically analyzed because of insufficient usage, which yielded inadequate data. It is now thought that the categories of thinking aloud and exclamations were used as personal strategies by the older adult couple in the pilot study. With greater sample size and additional perspective, it seems that the couple in the pilot study was not typical and did not accurately represent the older adult population with hearing loss in their usage patterns for these two categories. The categories that showed significant differences between the two groups were neutral statements, nonspecific confirmations, directive statements, and humor.

Neutral Statements

Both men and women used neutral statements more in quiet situations of low communication stress. Of the two groups, neutral statements were more often used by those in the group with normal hearing regardless of gender or environmental differences. Markel (1998) separated the categories of content into those that were informational and less personal and those that were relational and considered more personal. The greater use of neutral statements by those in the group with normal hearing implies the need for less involvement or a more casual attitude by the two partners during the completion of the conversational task. The two groups showed a decline in the use of neutral statements with the addition of noise, indicating the stressful environment necessitated more effort or commitment by both groups to communicate. Perhaps the switch to the use of other categories in the noise environment, and by the group with hearing impairment, was because the exchanged categories chosen were more specific and provided better communicational clarity.

Nonspecific Confirmations

Similar logic may apply to explain why the category of nonspecific confirmations was used significantly more often in the group with normal hearing. Caissie et al. (1998) found the need for control during conversational interactions to be a major factor for adults with hearing loss. Neutral statements are not used as a control category since these types of statements would not serve to refine or lead the conversation in a specific direction. Thus, they may have less appeal to those in the group contending with male hearing loss.

Directives

Directive statements and humor were less frequently used than other categories that were analyzed (excluding Exclamations and Thinking Aloud categories), but they were used more by the group with male hearing loss than by the group with normal hearing. As is mentioned in the preceding paragraph, statements that direct action would serve as forms of control. In contrast to neutral statements, the use of direct statements would also be a way of expressing a message with less potential ambiguity. For example, there is less confusion with the direct statement, “clean out the garage,” than the neutral statement, “I noticed the garage is starting to look cluttered.” This might be relevant to couples with male hearing loss who experience recurrent misunderstandings. Hallberg (1996) and Oyer & Oyer (1979) have referred in their writing to frequent misunderstandings and the resultant irritation as a negative influence on communication intimacy.

The use of direct statements is also faster and more efficient. Because many direct statements are commands they serve to close a conversational interlude preempting any discussion, argument, or sharing of feelings. Direct statements are frequently used by those in authority to those of less status. So, unless direct statements are used carefully they can be offensive when used by those of equal status. Directive statements were used more by women of both groups than by the men of either group, despite environment. The group with male hearing loss used more directives than the group with normal hearing across genders and environments. Couples in the group with male hearing loss have probably learned from experience, that the use of directives avoids some of the potential misunderstandings in conversations. The disadvantage of using directive statements, however, is that directives do not foster intimacy or conversational sharing.

Clinical observation has noted a tendency on the part of some spouses to step out of the marriage role as an equal and become more nurturing when their spouses are faced with disability. In this way, the spouse assumes greater authority. The use of directives indicates a form of this shift of authority and control and may indicate a perception of the spouse with normal hearing being in control of the conversation. Hallberg and Barrenas (1993) identified four types of coping strategies used by wives when confronted with their husband's problems with hearing loss. The minimizing strategy, in which the wife tries to shield her husband from the effects of his disability by denial and the mediating strategy, in which the wife takes on the responsibility for controlling the situation, are consistent with frequent use of directives for communication. The wife taking charge may encourage the response of withdrawal or foster resentment, particularly if the husband is facing adjustment to retirement during the same period.

Humor

The greater use of humor by the group with male hearing loss may stem from a response to increased tension or frustration during the communication process. Those in the group with male hearing loss may have found the use of humor can meet social needs and provide needed tension relief. Hallberg (1996) noted tension being present during conversations with family members was a frequent problem mentioned by those with hearing impairments and in interviews with spouses. The use of humor can also be used as a distraction from consequences of mistakes and as a buffer to soften the harshness implied in direct commands. In this study humor was only used in a positive manner, and there were no instances of critical or negative humor represented in any of the transcribed conversations.

Lefcourt and Martin (1986) found in their research on humor as a moderator for stress that humor reduced the impact of stress in recent negative life events and positively affected current mood disturbances. In other studies by Lefcourt and Martin pertaining to humor as a coping process in marriage, it was concluded that women used humor to soften problematic situations and found humor usage associated with feelings of mastery, happiness, and marital satisfaction. Humor was also found to encourage problem solving and resiliency behavior for women. The use of humor was not as positive for the men in this study. Men reporting to use humor as a strategy felt less satisfaction in their marriage.

These findings reflect the wide range of what is termed as humor. Chapman (1976) differentiated between humor and wit. Wit is associated with cleverness and can be used to point out flaws and errors increasing the negative affects of a situation. Humor can better be used as a therapeutic component and involves a shift of perspective that allows distancing to be achieved as a buffer to over-involvement in a negative situation. It is this distancing aspect that would be beneficial to those in the male hearing loss group, allowing them to rise above the frustration of miscommunication.

Topic Patterns

The measurement of topic patterns was accomplished in two ways--by determining the number of topics initiated by each subject and by determining the longest episode of turn taking on a single topic introduced by each member of the couple. Topic patterns were analyzed by group and gender only, as topic information extended through the segment boundaries of the recorded conversations. The women began more topics than the men in both groups and in both environments. This finding indicates women take a greater responsibility than men do for finding subject matter of interest to continue the conversation. This agrees with the findings reported by Crawford (1995) who, during a study of married couples, found women to introduce more topics but men to be the decider for which topic would be sustained. In this study there was no indication that the decision of which topic would be sustained was attributed to the men. In the measurement of topic maintenance, no gender significance was noted.

The analysis of the longest supported topic episode did show a group difference that was important. The group with hearing loss sustained their topics longer than the group with normal hearing. Potentially, the longer episodes of turn taking by the group with male hearing loss could indicate an interest in lengthy discussions on topics of mutual interest. However, it is more likely that the longer maintenance of topic arose from a desire to minimize the hazards of topic change. Caissie et al. (1998) and Bayles, Tomoeda, and Boone (1985) pointed out that older age necessitates the need for increased amounts of attention and effort during rapid conversations, especially on unfamiliar topics. Sustaining a topic of conversation would be a good strategy to be used by the group with male hearing loss, if they desired to produce conversation that would have few misunderstandings, as errors occur most frequently during topic changes. Sustaining a conversational topic would also minimize effort, making the interaction more pleasant for both partners.

Communication Breakdown

A further difference between groups was identified by the tabulation of elements of communication breakdown. Couples in the group with male hearing loss experienced a greater number of content breaks and a greater need for repetition of content in their conversational interactions than did the group with normal hearing. The reason for these communication interruptions may be attributed to a decrease in hearing sensitivity which can cause sound discrimination to decline. Markers on words, such as plurals, are more difficult to recognize. Errors occur in words that are similar in number of syllables and that seem to make contextual sense. For example, if a spouse was talking of guests coming for the holidays and said, “Chris must be invited,” the male member with the hearing loss might ask for clarification by saying, “What about Christmas?” These disruptions in the conversational flow denote misunderstandings and characterize a need for additional communicative effort. The interruptions are dysfunctional to maintaining topics as the thought train, or ideas in memory may be lost during the time of communication repair. Additionally, the extra effort to converse may cause distancing and communication avoidance. Caissie et al. (1998) found adults with hearing losses often used nonspecific requests that subsequently brought about the need for frequent repetition during the spouses' conversational responses.

Although the amount of congruent talking was tabulated for each couple, there was no significant difference between the groups on the use of this conversational element. Whether or not a couple talked at the same time to one another seemed to be related to their conversational style and to reflect the importance of maintaining formal social manners within their relationship.

The 5-minute duration of the conversations was timed by an investigator outside of the room that was used for the recordings. At some point in the conversation, some of the couples would remark on how the time of the recording seemed to be longer than 5 minutes, or they would inquire of their partner if they knew how much more time remained. These types of time comments were made with greater frequency by the group with male hearing loss than by the group with normal hearing. This concern about the passing of time outside of the on-going conversation was considered an indication of a large amount of effort being expended for completing the task. Comments made on the passing of time indicated possible fatigue. The findings of Hetu et al. (1993) concur for fatigue is cited as a factor affecting both partners of a communication dyad with the existence of hearing loss. The pressure to communicate in the home is counterbalanced by the need to relax. In this study there was implied pressure to talk during the recorded segments so that the effort involved is commented upon and shared with the familiar partner.

The Role of Spouse in Communication

This study also looked at the ways a spouse accommodates her actions and her communication style when her husband develops a hearing loss. It was predicted that women in couples with male hearing loss would take greater responsibility than their husbands for maintaining the conversational flow. These women would also take greater responsibility than their counterparts in the group with normal hearing. This prediction was not demonstrated by the results of the present study. Topic initiation was significantly greater for women, but not solely for the women in the male hearing loss group. As was mentioned in the previous discussion of topic patterns, women have been found to initiate more conversational topics (Crawford, 1995).

Gender differences were found to be significant for the use of the directives category in conversation but once again for women in both groups. Although the group with male hearing loss also was shown to use more directives, a group/gender interaction was not obtained. This indicates that the use of directives can not be exclusively identified as a strategy of accommodation for use by the women in the group with male hearing loss. The women in the group with male hearing loss demonstrated potential accommodation to their husbands' hearing decline by talking less, allowing the male spouse with the hearing loss less competition in percentage of talking time.

The women in this study in the group with male hearing loss demonstrated less active conversational control than was anticipated. Their way of accommodation to their spouses' hearing impairment was to draw back, encouraging and facilitating greater participation by their husbands.

Strengths and Limitations

Strengths

When this study was initiated, research data concerning the effect of male hearing loss on conversation and family communication systems had been gathered by questionnaires, surveys, and in interviews (Getty & Hetu, 1991; Hallberg, 1996; Hallberg & Barrenas, 1993; Hetu et al., 1993; Jones, 1987). The perspective of the individual with the hearing disability and their spouse related clearly that both partners felt their lives were changing as a result of this impairment. In this study, the analyses of spontaneous conversations have provided data to support the accuracy of earlier prospective reports. The analyses have also provided information that may lead to further research on this topic. Both audiologists, attempting to maximize the effectiveness of remediation methods for their clients, and speech-language pathologists, realizing that communication treatment is warranted for hearing loss as any other expressive-receptive impairment, may address more clinical attention to this growing segment of population.

With the large number of adults with hearing impairments who do not wear their hearing aids, a communication assessment could raise the couple's awareness of how their conversation has changed with the onset of hearing loss. A communication treatment program could introduce strategies to decrease energy expenditure and minimize misunderstandings and disruptions to conversational flow. Some strategies might include minimizing the use of pronouns and encouraging greater use of specific names, use of intonation and stress markers to be used for important content words, use of articles for redundancy on plurals, gestures to be used to indicate a change of topic, and specific ways to structure conversational interactions for repair efficiency. This would facilitate more satisfying interactions and combat development of controlling or withdrawing behaviors. Better conversational interactions might bring about greater appreciation and understanding of the benefits of hearing aid use.

Limitations

There were several characteristics of the subjects used in this study that might reduce the generalizability of the findings. Many of the participants in this study lived in retirement communities in which broad ranges of activities were provided by the management, and residents were encouraged to join by their social peers. This may have caused the unanticipated large number of activities reported by the members of both groups. The age similarities within the communities may have also reduced the stigma of announcing the presence of a hearing loss (Hetu, 1996).

The composition of the subjects of this study in the group with male hearing loss were inflated for the use of hearing aids over a normal population as many of the participants were recruited from referrals of previous clients of a speech and hearing clinic. Additionally, the demographic information obtained demonstrated prior communication training for 17.5% of the group with normal hearing, while only 10% was reported by the group with male hearing loss.

The age and educational differences between the two subject groups, while not shown to be statistically significant, could still have influenced the results with cohort effects. The generalizability of the study is limited by the restricted representation of race, socioeconomic levels, and geographic boundaries.

Humor is used as a coping strategy for dealing with anger and frustration. It may be that the subjects in the group with male hearing loss have found this strategy effective in an effort to soften their directive statements or to combat frustration arising from frequent errors. It might also be that the subjects in the group with male hearing loss were especially uncomfortable during the testing and recording process and used humor to cover their nervousness. In the latter case, the reported use of the humor category more often by those in the group with male hearing loss, as a compensatory strategy for addressing errors associated with the decline in hearing sensitivity, would consequently be unreliable.

It was decided, when the study was originally designed, that couples would not feel comfortable to talk freely if they were videotaped. Encoding was attempted directly from the auditory tapes, but the rate of speech of the couples was too rapid for accuracy. Therefore, since the encoding was done from written transcriptions, it was not possible to pick up sarcasm or humor from facial expressions or tone of voice. Those quieter participants may also have been using facial expression or gestures to provide confirmation of their partner's expression or to relate associated feelings. The decision not to videotape in order to obtain less self-conscious conversation eliminated discovery of important interactive information transmitted by nonverbal communication.

Suggestions for Future Research

It would be beneficial to design a similar study using females with hearing loss to ascertain if the present findings are gender bound. Additionally, a study of couples where both partners would be hearing impaired might provide a severity baseline.

The reported conversational difficulty associated with a noisy environment for wearers of hearing aids and for those with male hearing loss was not well demonstrated in this study as the conversational performance of both subject groups declined in noise. A research investigation using a naturally noisy environment might better demonstrate and confirm this clinical observation.

The older age of the couples in this study was chosen to represent the most concentrated segment of the population with acquired hearing loss. Age and cohort effects however may have been responsible for the findings obtained. A similarly designed study using a younger population sample or a comparison study with younger and older adult couples would add validity to the current results by adding an additional age perspective.

It would also be helpful to undertake recording longer conversations to see if the 5-minute episodes used in this study are actually representative of casual spontaneous speech. A longer recording might encompass a fatigue factor, which might cause more deterioration in the balanced turn taking as is seen throughout this study.

The format of the data collection procedure used in this study might also work for investigating conversations of couples with other communication system impairments. A study with patients and families coping with the poststroke effects of anomia or aphasia might demonstrate the use of similar strategies.

Although the topic patterns were examined in this study, the content of the topics was not part of the data analyzed. Caissie et al. (1998) found that adults with hearing loss change conversation topics to those that are familiar or concern themselves as a strategy for communication control. Hummert et al. (1994) viewed the negative or positive aspect of the topic as a factor of communication satisfaction. Both of these observations might be incorporated into future research, adding more substance to the study of topic patterns.

Summary and Conclusions

In addition to the research question of whether or not couple communications are changed by the disability of hearing loss, six specific hypotheses concerning communication categories were to be answered by the results of this study. The hypotheses concerning the categories of communicational intent were as follows:

1. Females in couples with male hearing loss will demonstrate proportionally more use of directive statements than females in couples with normal hearing.

It was thought at the beginning of the study that the women in the group with male hearing loss would use this category to improve conversational efficiency in getting the message to their husband with minimal misunderstanding. Women in both groups, however, rather than just the women in the group with male hearing loss, used this category more than their partners. The men and women in the group with male hearing loss used directives more than the group with normal hearing. However, no interactions were obtained for the category. Significance in main effects alone does not enable the first hypothesis to be confirmed. The idea that direct statements would be used, as a strategy by the spouses of the males with hearing loss as an efficient and succinct way of communicating a message was not determined by the results of this study.

2. Males in couples with hearing loss will use more nonspecific confirmation statements to maintain conversational flow than will males in couples with normal hearing.

The reasoning behind the formation of this hypothesis was that men with hearing loss would use a generic confirmation category requiring less use of energy and effort, while for the men in the group with normal hearing this would not be a concern. Also, it was thought that men with hearing loss would take advantage of this response category to keep the conversation flowing without having to provide the context-specific responses, which required greater sustained attention. The results of the study did not support this line of reasoning. The study findings indicated greater use by both males and females in the group with normal hearing. The category was also used more in the unstressed (quiet) environmental condition. The conclusion that can be drawn is that those who use this category do so in the situation where response clarity is not crucial for understanding. These results provide insight of the importance placed on confirmation clarity by the women and men dealing with male hearing loss problems during their conversations.

3. Couples with male hearing loss will produce fewer shared opinions, judgments, and beliefs than couples with normal hearing.

All participants regardless of gender, group, or environmental conditions frequently used the category of judgments. It was predicted that fewer judgments would be used by the group with male hearing loss as an outcome of the anticipated concise interactions; however, the conversations of both groups and genders were permeated throughout with the use of this category. The couples of both groups enjoyed commenting on what they thought of the events around them, their opinions of family members and friends, and what should or should not be done and the manner in which it should be handled. As can be noted from the responses to the demographic question of the number of activities in which they participated (see Table 1 or Appendix B), subjects were very active and socially immersed in their communities. Judgment statements were necessary to sharing observations and opinions for all subjects within this study. There was no evidence found of the use of a withdrawal strategy being used by the males with hearing loss.

4. There will be no significant difference in the use of neutral information statements and requests of couples with male hearing loss compared to couples without male hearing loss.

It had been thought that both groups of this study would use factual references with equal frequency. What was found, however, was that neutral statements were used more often by those without disability constraints on their communications and in the condition most conducive to conversation. The more rapid change of topic in the group with normal hearing and the increased percentage of talking time by the women in the group with normal hearing facilitated greater use of this category. Neutral statements also had a greater chance of misunderstanding due to less information being related via the nonverbal communication system. The use of neutral statements may have been switched by those in the group with male hearing loss to the use of the directives category, which would be less likely to be misunderstood, or the switch could have been to the judgment category which would encompass more intensity and would be better supported by the nonverbal communication system of facial expression, voice tone, body language, eye gaze and gestures for added clarity.

5. The initiation of new topics will be shared by couples with normal hearing but will be skewed to one member in couples with male hearing loss.

The results showed women of both hearing groups and in both environments dominating this area of measurement as can be seen in Table 12 and Figure 4. The findings, however, were not important in determining a group difference. The findings were more revealing in the demonstration of sustained topic maintenance found in the group with male hearing loss. This implies that the couples with male hearing loss may be aware of the pit-falls of rapid topic change and, when placed in a situation in which they need to converse, manipulate the subject-matter to ease conversational breakdown.

6. The females in couples with hearing loss will use greater proportional talking time than the females in couples with normal hearing.

This premise of the hypothesis above_reflected the findings from the initial pilot study. The larger sample size of this study gave a clearer representation. It had been thought that the women in the group with male hearing loss would feel responsible for buffering their husbands performance and would act to take charge of the conversation and as a consequence use a greater amount of talking time. This was not found during the data analysis. During the transcription of the recorded conversations, it was noted that in both groups there were conversations dominated by one member or the other of a couple. Overall, however, the members of the couple that controlled the conversation by using the most talking time were the women in the group with normal hearing. These results conflict with the findings of Hallberg's (1996) study in which males with hearing loss used controlling the conversation or withdrawing from the conversation as compensatory strategies. It can be concluded that in this study the men with hearing loss did not withdraw from conversational interaction or attempt to control it, but instead committed energy and effort into meeting the demands of the shared communication task. The women in the group with male hearing loss also encouraged their husbands' participation.

7. Conversational performance of both groups will decline in the noise environment.

The rational for this hypothesis stemmed from interview reports of Hetu (1996), Erber et al. (1996), Hygge et al. (1992), Hetu et al. (1987), and Kyle (1987) that a noisy environment was a hindrance to conversational comprehension by those with hearing loss. It was assumed that those subjects in the group with normal hearing would also experience some need for greater attention in the noise environment, thus causing a change in the conversational interactions. In this study, a tape with multi-talker (speech) noise was used for the simulated noise environment. The findings indicated less idea units were generated in noise by both groups. Conversational categories that relayed less information, neutral statements, and nonspecific confirmations were used less in noise than in quiet. These results seem to confirm the hypothesis of noise as a conversational stressor to both groups.

In summary, the findings of the participation measures indicated subjects and subject couples who had the highest comfort level, who were not impaired with male hearing loss, and were in an unstressed environment produced the highest levels of activity. The greater use of neutral statements and nonspecific confirmations by those with normal hearing also indicates that conversational precision is not of concern to this group.

The group with male hearing loss used more directive statements and more humorous statements than the group with normal hearing. These results imply conversational accommodation being used by both members of the couples with male hearing loss. Also, the slower changes in topic during the conversations indicate a desire by both partners of this group to minimize the strain on their conversational communications. The measurements of the elements of conversational breakdown show this concern is warranted. The increased comprehension breaks and the need for repetitions of content for the group with male hearing loss may demonstrate the necessity of expending additional effort for conversation by both partners. The male with the hearing loss may have to ask for additional information and inform his partner of the loss of understanding. The spouse must paraphrase, or repeat what was said with more emphasis, in order for the conversation to continue. The finding of greater comments on the passing of 5 minutes of recorded conversation by the group with hearing loss serves to demonstrate the extra effort and fatigue, which took place during these conversations.

There was a difference of the women being generally more talkative than the men. This result could be a consequence of stronger interest on the part of the women for being in the study and therefore feeling more of a responsibility to carry the conversation. This is suggested as possible because most of the couples participating in the study were initially motivated to volunteer by the persuasion of the wives. Another possible explanation for this result might be that the women had a greater interest in the topics that were discussed. Women in both groups were responsible for initiating more topics than their husbands. This may have stemmed from a cohort effect of women feeling greater comfort in the role of conversational leader in social situations.

The varying of environments by noise levels was important in conjunction with the ease with which the group with normal hearing performed. For this group the noise was a stressor that reduced their participation performance and caused them to use fewer nonspecific and neutral conversational categories, switching to categories providing more definite information. The couples in the group with male hearing loss were used to communicating with a stressor, hearing loss. Their strategies were already functioning, so they were less affected in their performance by the addition of further stress on their communications than the group with normal hearing.

The results did not demonstrate a broad gender difference across the measures of data analysis. Women led in initiating topics and in talking time, but these were measures of commitment to the task rather than changes in conversational structure. Males were not shown to predominate in any measurement area regardless of group. This low gender effect implies that either the study was not designed to isolate the existing gender differences or that there are fewer gender differences than were anticipated. Further research is needed to identify which these two conclusions are more accurate.

The following suggestions relate to the findings of this study and the benefit to couples experiencing communication inhibition after the identification of a male hearing loss:

1. An assessment should be undertaken of the couple's current conversational practices using an audiotaped 10-minute session in the home environment. This would be used to determine if there is a dominant speaker during interactions, if the members are using the categories of communicational intent appropriately to the purposes and the situations of the conversation, if topic initiation and topic support are shared responsibilities, and to determine which elements of communication breakdown are occurring and the rate at which they are happening. This information would enable disruptive patterns to be recognized by the therapist and the taped script would enable the couple to gain

a better awareness of the potential causes for the feelings they are experiencing (frustration, irritation, depression, distancing from loss of intimacy). Types of situational interferences might also be identified that should be considered in the counseling process (ex. kitchen noise).

2. Couples should attend an education and training program that would include the understanding of the advantages and disadvantages of the various categories of communicational intent. Program content would encompass the use of nonverbal communication techniques (tone of voice, facial expression, body language, eye contact, gestures) to add to conversational clarity. Hand gestures could be established to emphasize change of topic and turn taking. Strategies using changes of sentence structure and intonation could be taught and practiced.

3. The program should include role playing and conversational practice so that the members of the couple share an understanding of how the onset of the hearing disability is experienced by each member of the couple.

4. One of the last sessions of the program should be dedicated to the couple's self-assessment of the changes that have occurred in their communication system since the beginning of the program and the problems that continue to need attention. Tapes of other couples having communication problems could be played and criticized by the couple to reinforce the strategies learned and for mutual empowerment.

In answer to the basic research question of whether or not hearing disability changes the way in which older couples communicate, this study has shown that communication does change as a result of the onset of hearing loss. These changes affect both marriage partners. Hallberg (1996) said that the person generally thought to be responsible for adjusting to the hearing disability is the individual with the hearing loss. The findings of this study indicate that the spouse takes responsibility for adjustment to the hearing loss as well. The important role that is played by the spouse in modifying the couple's communication system may determine the level of handicap experienced by both partners. It is imperative that the wife be considered an equal client by the audiologist when information is provided and decisions are made at the identification of a hearing impairment. The structural disability of hearing decline is also a functional disability shared by the spouse.

APPENDIX A
SCREENING FORMS

SUBJECT DEMOGRAPHIC FORM

Date________

Name____________________________________ Subject #____

Date of birth____________ ____________

Educational Level: (please mark the highest level achieved)

self educated________ eight grade_______
some high school_____ high school degree_____
some college________ Bachelor's degree______
technical schooling___ advanced degree_______

Years of current relationship: (please mark the one that applies)

less than 1______ 1 - 5_____ 5 - 10 _____ more than 10 ______

Do you have any uncorrected vision difficulty? yes____ no______

Please mark if you have had a stroke? yes_____
A recent hospitalization? yes_____
If you have a terminal illness? yes _______
A diagnosis for dementia? yes ______

Are you taking any medication that would cause you to be drowsy? yes__ no____
That would make it difficult to speak? yes____ no______
That makes you confused or lose track of time? yes____ no_____
That makes it difficult for you to understand what is said to you? yes___ no___

Do you believe that you have a hearing loss? yes ____ no______
If yes, has your hearing loss been confirmed by testing? yes___ no____
If yes, what age were you when your hearing loss was identified?_______
Do you have a hearing aid? yes___ no___ Do you wear it daily? yes__no___

Have you had any previous communication training? yes____ no____

What is your current or past occupation? ____________________________

Please check any social situation you attend:

church____ shopping____ restaurant____
work____ civic meetings____ movies____
special interest groups _____ meetings____
conventions or trade shows____ volunteer work _____
other______________________________

Thank you for taking the time to complete this form!

SCREENING FORM OF HEARING HANDICAP INVENTORY FOR THE ELDERLY (HHIE)

Name______________________________ Date____________
DOB___________

HHIE-S Item		Yes (4)	Sometimes (2)	No (0)
E-1	Does a hearing problem cause you to feel embarrassed when meeting new people?	___	___	___
E-2	Does a hearing problem cause you to feel frustrated when talking to members of your family?	___	___	___
S-1	Do you have difficulty hearing when someone speaks in a whisper?	___	___	___
E-3	Do you feel handicapped by a hearing problem?	___	___	___
S-2	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	___	___	___
S-3	Does a hearing problem cause you to attend religious services less often than you would like?	___	___	___
E-4	Does a hearing problem cause you to have arguments with family members?	___	___	___
S-4	Does a hearing problem cause you difficulty when listening to TV or radio?	___	___	___
E-5	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	___	___	___
S-5	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	___	___	___

Scoring: Emotional ___
Social ___
Total ___

IRB# 382-95

Informed Consent to Participate in Research

The University of Florida
Health Science Center
Gainesville, Florida 32610

You are being asked to participate in a research study. This form provides you with information about the study. The Principal Investigator (the person in charge of this research) or his/her representative will also describe this study to you and answer all of your questions. Read the information below and ask questions about anything you don't understand before deciding whether or not to take part. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled.

Name of the Subject

Title of Research Study

Analysis of Conversational Speech by Older Couples: Changes with the Stress of Hearing Loss

Principal Investigator(s) and Telephone Number(s)

Alice E. Holmes, Ph.D. 352-392-4471
Susan Harned, MA 352-375-1795
Norman Markel, Ph.D. 352-392-2113

Sponsor of the Study

What is the purpose of this study?

The purpose of the study is to gain information on how couples' communication systems change when one member has a hearing loss.

What will be done if you take part in this research study?

You will be asked to complete a one-paged questionnaire about you and your life and answer ten questions on your hearing. You will have your hearing tested by a qualified clinician. You and your spouse will be recorded on audiotapes talking for two five minute segments in both a quiet and in a noisy environment.

What are the possible discomforts and risks?

No known potential risks or discomforts are associated with this study.

If you wish to discuss the information above or any other discomforts you may experience, you may ask questions now or call the Principal Investigator listed on the front page of this form.

What are the possible benefits to you or to others?

You will have your hearing tested.

If you choose to take part in this study, will it cost you anything?

No

Will you receive compensation for your participation in this study?

No.

What if you are injured because of the study?

If you experience an injury that is directly caused by this study, only

__ professional medical __ professional dental _x_ professional consultative care

that you receive at the University of Florida Health Science Center will be provided without charge However, hospital expenses will have to be paid by you or your insurance provider. No other compensation is offered.

If you do not want to take part in this study, what other options or treatments are available to you?

Participation in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future health care you receive at this institution.

How can you withdraw from this research study?

If you wish to stop your participation in this research study for any reason, you should contact: Alice E. Holmes, Ph.D. at (352) 392-4471. You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits to which you are otherwise entitled. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

In addition, if you have any questions regarding your rights as a research subject, you may phone the Institutional Review Board (IRB) office at (352) 846-1494.

How will your privacy and the confidentiality of your research records be protected?

Authorized persons from the University of Florida, the hospital or clinic (if any) involved in this research, and the Institutional Review Board have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. If the research project is sponsored or if it is being conducted under the authority of the United States Food and Drug Administration (FDA), then the sponsor, the sponsor's agent, and the FDA also have the legal right to review your research records. Otherwise, your research records will not be released without your consent unless required by law or a court order.

If the results of this research are published or presented at scientific meetings, your identity will not be disclosed.

Will the researchers benefit from your participation in this study (beyond publishing or presenting the results)?

No

APPROVED
From 11/13/98 To 11/13/99
Institutional Review Board CJA
IRB [illegible]

Signatures

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study:

Signature of person obtaining consent — Date

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this Form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

Signature of Subject — Date

Signature of Witness (if available) — Date

APPENDIX B
DEMOGRAPHIC RESPONSES

Demographic Responses

NL, DEMOGRAPHICS

Couple Number	Age	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#1A (female)	62	some col.	10+	secretary	4	no	0	no	no
B (male)	63	tech.	10+	acct./sales	3	no	0	no	yes
#2 A	63	tech.	10+	homemaker	6	no	4	no	no
B	63	adv.	10+	C.O.O.	6	no	0	no	no
#3 A	65	tech.	10+	realtor	6	no	0	no	no
B	68	some col.	10+	realtor	5	no	4	no	no
#4 A	56	B	10+	teacher	9	yes	6	no	no
B	53	B	10+	C.P.A.	5	no	0	no	no
#5 A	68	some col.	10+	contr. officer	4	no	0	no	no
B	69	some col.	10+	police officer	6	no	2	no	yes
#6 A	64	tech.	10+	secretary	6	no	4	no	no
B	66	some col.	10+	drafting supervisor	7	no	2	no	no
#7 A	57	tech.	10+	homemaker	6	no	0	no	no
B	64	some col.	10+	systems eng.	5	no	0	no	yes

Demographic Responses--continued

Couple Number	Age	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#8 A	60	HS	10+	typist	7	no	2	no	no
B	63	HS	10+	sales	8	no	0	no	no
#9A	63	adv.	10+	teacher	9	yes	0	no	yes
B	64	adv.	10+	retired	7	no	4	no	no
#10 A	57	adv.	10+	S.L.P.	8	no	0	no	no
B	56	adv.	10+	veterinarian	5	no	4	no	no
#11A	60	HS	10+	secretary	6	no	0	no	no
B	81	B	10+	retired	7	no	2	no	no
#12A	56	B	10+	teacher	9	no	0	no	no
B	56	adv.	10+	statistician	9	no	6	no	no
#13A	56	adv.	10+	teacher	9	yes	6	no	no
B	64	adv.	10+	engineer	5	no	0	no	no
#14A	49	adv.	10+	educ. admin.	10	no	0	no	no
B	71	adv.	10+	teacher	6	no	0	no	yes
#15A	52	some col.	10+	office mgr.	5	no	2	no	no
B	63	adv.	10+	engr.	6	no	0	no	no
#16A	59	adv.	10+	principal	7	no	2	no	no
B	64	tech.	10+	firefighter	7	yes	4	no	yes

Demographic Responses--continued

Couple Number	Age	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#17A	55	B	10+	phy. therapist	9	no	0	no	yes
B	55	adv.	10+	pharmacist	9	yes	4	no	no
#18A	56	B	10+	teacher	9	no	6	no	no
B	61	adv.	10+	plumbing contr.	7	no	0	no	no
#19A	71	adv.	10+	teacher	3	no	2	no	no
B	75	adv.	10+	professor	5	no	2	no	no
#20A	48	adv.	10+	teacher	9	no	2	no	no
B	57	B	10+	pilot	8	no	4	no	no

HL, DEMOGRAPHICS

Couple Number		Ag e	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#21	A	62	HS	10+	secretary	7	no	0	no	no
	B	64	adv.	10+	minister	4	yes (63)	12	no	no
#22	A	66	B	10+	teacher	5	no	6	no	no
	B	66	adv.	10+	teacher	5	yes (54) 14	14	yes, yes	no
#23	A	72	adv.	10+	teacher	8	no	2	no	yes
	B	74	B	10+	Lt. Col.	7	yes (62) 18	18	yes, yes	no
#24	A	62	some col.	1->5	R.N.	8	no	0	no	no
	B	66	HS	1->5	contractor	9	yes (40)	12	no	no

Demographic Responses--continued

Couple Number	Age	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#25 A	58	HS	10+	homemaker	9	no	4	no	no
B	60	some HS	10+	lab. tech.	9	yes (45)	14	no	no
#26 A	68	HS	1->5	homemaker	5	no	8	no	yes
B	73	HS	1->5	agriculture	7	yes (?)	14	no	no
#27 A	71	some col.	10+	sales	4	no	2	no	no
B	74	some col.	10+	sales mgr.	3	yes (71)	30	yes, no	no
#28 A	74	HS	10+	administrator	5	no	0	no	no
B	78	HS	10+	optician	5	yes (75)	24	no	no
#29 A	69	HS	10+	homemaker	7	no	0	no	no
B	71	B	10+	accountant	6	yes (65)	24	no	no
#30 A	75	HS	10+	homemaker	4	yes (?)	6	no	no
B	73	adv.	10+	farmer/C.P.A.	3	yes (50)	18	no	no
#31 A	70	HS	10+	secretary	5	no	0	no	no
B	70	tech.	10+	transportation	7	yes (64)	40	yes, yes	no
#32 A	63	HS	10+	tutor	6	no	2	no	no
B	70	tech.	10+	tech. superv.	4	yes (40)	18	yes	no
#33 A	70	HS	10+	homemaker	6	no	8	no	no
B	74	adv.	10+	professor	6	yes (62)	20	yes,yes	no

Demographic Responses--continued

Couple Number	Age	Education	Yrs. in Rel.	Occupation Activities	# of soc. activities	Hearing Loss?	H.H.I.E	Hearing Aid/Wear?	Com. Training?
#34 A	72	some col.	10+	retired	3	no	0	no	no
B	72	adv.	10+	dentist	4	yes (60)	12	yes,yes	no
#35 A	65	HS	10+	homemaker	4	no	0	no	no
B	68	HS	10+	retired	4	yes (50)	24	yes,yes	no
#36 A	76	some col.	10+	homemaker	6	no	0	no	no
B	75	adv.	10+	professor	6	yes (72)	14	yes,yes	no
#37 A	69	adv.	10+	teacher	9	no	2	no	yes
B	81	adv.	10+	professor	9	yes (78)	14	yes,yes	yes
#38 A	60	some col.	10+	homemaker	5	no	2	no	no
B	69	adv.	10+	physician	6	yes (67)	14	yes,yes	no
#39 A	68	B	10+	homemaker	3	no	0	no	no
B	72	B	10+	envir. engr.	5	yes (58)	30	yes,yes	no
#40 A	66	some col.	10+	retired	7	no	0	no	no
B	68	some col.	10+	cable tech.	8	yes (?)	12	no	no

APPENDIX C
SAMPLE ENCODING

Sample of Encoded Text

A Well, I think we had a great time Wednesday night with them. (judgment)

B Exactly. I agree. (specific confirmation)

A Going to Space Center, uh, she really enjoyed that a lot. (judgment)

B She'd a liked to have stayed longer.(judgment)

A Yeah. (non-specific confirmation)

A What are you going to do this afternoon? (neutral information)

B I thought I should blow-out those leaves from the garage.(judgment)

A Yes, do that today. (directive)

B I'm tired of that chore (judgment)...maybe I should blow-up the garage instead of blowing it out. (humor)

A As far as I'm concerned you can do that too, if you want! (humor)

B I wish we could.(judgment)

A Did you see the new houses they're building on the west side of the golf course? (neutral statement)

B Yeah. (nonspecific confirmation)

A They are hugh. (judgment)

B Forget it. (directive)

B We're not going to get one of those. (directive)

A I don't think I would want one (judgment)

A They would be too big for just the two of us (judgment)

B We could invite all the kids and their families down to live with us. (humor)

A Sure, I can just see you doing that. (humor)

APPENDIX D
CONVERSATIONAL BREAKDOWN

Sample of Types of Conversational Breakdown

Content Break

A Was that your sister that called so late last night?

B Yes, it was Dorothy.

A Did she tell you when she was coming to visit?

B She had another argument with Sarah.

Repetition

A They're charging 99 cents now for a single tomato.

B What?

A They're charging almost a dollar for one tomato at the grocery store now.

B Did you say tomatoes or potatoes?

A One tomato.

Congruent Talking

A Which concerts do you want to buy tickets for?

B I think the Shubert and the Christmas one…

A The Christmas one is…

B …is always good.

A …my favorite.

Time Comments

B Hasn't it been five minutes yet?

B I think her watch has stopped.

A Yeah, I think you may be right.

APPENDIX E
RAW DATA

NL, Timing

	Quiet %	Noise %	Total %
#1A	54.94	57.35	56.29
#1B	45.06	42.65	43.71
#2A	64.18	33.27	49.91
#2B	35.82	66.73	50.09
#3A	74.25	63.24	69.20
#3B	25.75	36.76	30.80
#4A	38.32	47.81	42.78
#4B	61.68	52.19	57.22
#5A	54.13	55.56	54.70
#5B	45.87	44.44	45.30
#6A	61.60	62.27	61.82
#6B	38.40	37.73	38.18
#7A	66.56	62.89	65.13
#7B	33.44	37.11	34.87
#8A	48.06	83.14	63.92
#8B	51.94	16.86	36.08
#9A	51.00	49.21	50.06
#9B	49.00	50.79	49.94
#10A	47.00	69.88	58.06
#10B	53.00	30.12	41.94

NL, Timing (2)

	Quiet %	Noise %	Total %
#11A	52.07	43.45	48.09
#11B	47.93	56.55	51.91
#12A	66.10	29.71	50.10
#12B	33.90	70.29	49.90
#13A	58.21	87.00	73.76
#13B	41.79	13.00	26.24
#14A	44.94	62.18	54.20
#14B	55.06	37.06	45.80
#15A	70.51	83.09	77.32
#15B	29.49	16.91	22.68
#16A	47.93	49.77	48.81
#16B	52.07	50.23	51.19
#17A	58.36	86.99	71.80
#17B	41.64	13.01	28.20
#18A	64.05	28.93	46.47
#18B	35.95	71.05	53.53
#19A	26.00	15.23	20.29
#19B	74.00	84.77	79.71
#20A	57.27	49.82	53.87
#20B	42.73	50.18	46.13

HL, Timing

	Quiet %	Noise %	Total %
#21A	73.77	61.91	68.35
#21B	26.23	38.09	31.65
#22A	52.77	45.97	49.79
#22B	47.23	54.03	50.21
#23A	50.95	56.45	54.03
#23B	49.05	43.55	45.97
#24A	70.82	69.57	70.33
#24B	29.18	30.43	29.67
#25A	62.26	57.11	58.95
#25B	37.74	42.89	41.05
#26A	31.39	29.45	30.45
#26B	68.61	70.55	69.55
#27A	32.34	27.27	29.66
#27B	67.66	72.73	70.34
#28A	70.02	56.75	64.79
#28B	29.98	43.25	35.21
#29A	36.50	53.24	41.58
#29B	63.50	46.76	58.42
#30A	33.20	28.09	30.57
#30B	66.80	71.91	69.43

HL, Timing (2)

	Quiet %	Noise %	Total %
#31A	38.71	39.88	39.24
#31B	61.29	60.12	60.76
#32A	60.35	49.01	54.72
#32B	39.65	50.99	45.28
#33A	62.34	45.61	54.04
#33B	37.66	54.39	45.96
#34A	47.40	61.04	54.11
#34B	52.60	38.96	45.89
#35A	58.06	56.78	57.36
#35B	41.94	43.22	42.64
#36A	31.29	30.42	30.82
#36B	68.71	69.58	69.18
#37A	66.96	69.07	67.91
#37B	33.04	30.93	32.09
#38A	51.20	53.57	52.42
#38B	48.80	46.43	47.58
#39A	68.50	57.11	63.10
#39B	31.50	42.89	36.90
#40A	42.92	38.95	41.28
#40B	57.08	61.05	58.72

NL, Categories

	1AQ* *1AN**1BQ**1BN				2AQ**2AN**2BQ**2BN				3AQ**3AN**3BQ**3BN				4AQ**4AN**4BQ**4BN			
N1	0	0	4	5	2	9	5	2	3	8	6	2	6	1	8	3
N2	17	23	3	20	7	2	5	10	37	14	18	16	16	13	22	12
J1	0	2	2	2	0	2	0	0	0	4	1	2	0	0	0	0
J2	23	27	16	20	16	7	11	11	35	17	13	17	8	6	8	11
D1	2	0	3	0	3	0	3	0	0	2	1	0	1	0	2	2
D2	16	18	13	13	3	0	1	0	4	7	0	4	1	0	2	1
H1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
H2	0	4	0	1	0	1	0	1	2	0	1	0	3	1	9	7
C1	20	26	24	27	2	4	1	4	21	18	11	12	23	7	15	5
C2	9	20	10	18	2	1	0	1	10	4	3	0	14	15	9	8
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
EX	0	0	0	0	0	0	0	0	0	0	0	0	10	4	4	3
TL	87	120	85	106	35	26	26	19	112	74	54	53	83	47	82	52
	207		191		61		45		186		107		130		134	

NL, Categories (2)

	5AQ**5AN**5BQ**5BN				6AQ**6AN**6BQ**6BN				7AQ**7AN**7BQ**7BN				8AQ**8AN**8BQ**8BN			
N1	15	2	9	4	1	1	6	3	4	6	7	6	1	3	5	13
N2	17	8	27	3	11	8	10	3	27	19	13	9	9	16	5	1
J1	0	1	0	0	0	2	0	0	5	2	2	1	0	1	0	0
J2	10	8	2	9	25	11	16	11	31	12	27	16	2	12	4	2
D1	1	1	0	1	2	0	0	2	1	0	1	5	0	0	0	0
D2	1	1	9	0	3	2	1	0	15	9	6	2	6	1	7	0
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	0	3	0	5	1	0	0	0	0	0	1	0	0	0	0	0
C1	26	12	25	10	18	8	14	10	34	17	14	5	4	3	9	13
C2	9	6	9	5	5	6	7	7	14	7	3	6	0	0	2	2
TA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	4	5	2	3	0	0	0	0	0	0	0	0	1	0	0	0
TL	85	✓47	83	✓40	66	✓38	54	✓36	131	✓71	74	✓50	23	✓36	32	✓31
	132		123		104		90		202		124		59		63	

NL, Categories (3)

	9AQ**9AN**9BQ**9BN				10AQ*10AN*10BQ*10BN				11AQ*11AN*11BQ*11BN				12AQ*12AN*12BQ*12BN			
N1	7	6	5	3	4	5	0	4	6	6	5	1	3	9	14	4
N2	16	7	21	15	3	16	6	13	11	16	18	7	33	5	13	18
J1	1	0	0	0	0	1	0	1	2	2	0	1	0	1	0	1
J2	12	13	18	29	13	8	9	7	17	16	15	21	21	8	12	15
D1	1	0	3	0	1	0	0	0	0	4	0	3	0	2	0	1
D2	0	0	0	0	0	1	2	0	7	2	2	5	0	2	0	8
H1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
H2	0	0	0	0	0	1	4	1	2	0	1	1	0	0	0	0
C1	15	8	9	3	11	7	4	3	3	6	26	24	12	13	12	5
C2	7	1	7	1	7	4	4	3	6	4	11	16	7	5	2	2
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
TL	60	35	63	51	39	43	29	31	55	57	78	79	76	45	53	55
	95		114		82		60		112		157		121		108	

NL, Categories (4)

	13AQ*13AN*13BQ*13BN				14AQ*14AN*14BQ*14BN				15AQ*15AN815BQ*15BN				16AQ*16AN*16BQ*16BN			
N1	6	0	3	3	5	0	1	2	6	0	6	8	2	7	0	3
N2	15	9	13	3	3	5	10	4	13	19	12	1	12	7	18	12
J1	2	0	0	1	0	0	2	0	1	1	1	0	0	1	0	0
J2	9	20	11	9	7	13	4	10	14	11	8	2	17	5	6	7
D1	0	0	2	0	0	1	0	0	3	1	1	1	0	3	0	1
D2	4	2	5	0	1	2	0	1	9	3	4	0	2	9	2	9
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	3	0	3	0	0	3	1	4	0	0	0	0	0	0	0	0
C1	13	3	2	1	8	2	6	14	16	13	16	8	20	7	10	16
C2	21	6	11	1	8	6	6	5	4	5	4	8	0	3	7	1
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	2	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0
TL	75	40	50	18	32	32	30	40	68	53	52	28	54	42	43	49
	115		68		64		70		121		80		96		92	

NL, Categories (5)

	17AQ*17AN*17BQ*17BN				18AQ*18AN*18BQ*18BN				19AQ*19AN819BQ*19BN				20AQ*20AN*20BQ*20BN			
N1	12	2	2	5	1	6	5	2	12	10	0	0	2	3	4	5
N2	11	16	9	2	14	4	7	20	6	8	19	23	19	18	14	13
J1	1	1	0	0	0	0	0	0	1	2	0	0	2	1	3	0
J2	9	12	12	6	24	20	15	12	9	4	14	2	19	6	15	15
D1	2	0	0	2	0	0	0	2	0	0	0	1	1	0	0	0
D2	8	11	4	2	3	0	1	0	0	1	0	0	0	0	0	0
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	1	2	0	0	0	0	1	0	0	1	0	0	2	0	1	0
C1	6	5	5	1	11	15	14	13	10	10	3	1	8	7	10	10
C2	6	7	12	4	4	4	21	10	2	2	6	5	4	5	3	5
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TL	56	56	44	22	57	49	64	59	40	38	42	32	57	40	50	48
	112		66		106		123		78		74		97		98	

HL, Categories 1

	21AQ	21AN	21BQ	21BN	22AQ	22AN	22BQ	22BN	23AQ	23AN	23BQ	23BN	24AQ	24AN	24BQ	24BN
N1	2	3	14	1	2	8	7	5	1	10	0	1	7	4	1	1
N2	34	22	3	2	12	5	8	9	1	4	7	18	4	5	9	7
J1	0	2	0	1	0	0	2	0	0	0	2	0	1	1	0	0
J2	28	22	4	18	10	5	6	4	12	7	8	7	14	15	13	10
D1	2	0	1	0	1	3	2	0	5	0	5	0	9	4	0	2
D2	7	4	2	1	5	4	2	2	14	5	6	2	4	3	0	1
H1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
H2	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0
C1	5	3	49	21	2	2	4	3	6	10	17	5	3	4	5	0
C2	7	4	17	11	3	0	1	1	10	6	3	6	3	3	7	5
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0
TL	85	60	94	56	36	27	32	24	49	43	48	39	46	39	36	26
	145		150		63		56		92		87		85		62	

HL,Categories 2

	25AQ*25AN*25BQ*25BN				26AQ*26AN*26BQ*26BN				27AQ*27AN*27BQ*27BN				28AQ*28AN*28BQ*28BN			
N1	0	3	3	5	8	2	1	0	3	7	9	4	3	3	0	1
\N2	5	8	3	8	3	6	16	16	4	2	6	8	16	5	13	18
J1	0	0	0	0	0	2	0	0	0	4	1	0	4	1	1	1
J2	10	18	10	13	1	7	14	12	11	7	17	15	33	7	32	5
D1	1	1	0	1	8	4	0	0	1	1	2	2	10	1	0	0
D2	0	5	0	5	11	1	7	0	2	2	3	0	9	0	7	0
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	1	6	1	5	4	1	4	1	0	1	5	2	4	0	7	0
C1	5	10	6	5	8	5	5	5	20	5	5	11	8	7	19	6
C2	5	5	6	10	12	5	6	10	8	10	0	3	18	3	9	2
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	0	0	0	0	0	0	5	2	4	2	8	0	4	0
TL	27	56	29	52	55	33	53	44	54	41	52	47	122	27	92	33
	83		81		88		97		95		99		149		125	

HL,Categories

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	29AQ	29AN	29BQ	29BN	30AQ	30AN	30BQ	30BN	31AQ	31AN	31BQ	31BN	32AQ	32AN	32BQ	32BN
N1	1	0	0	0	1	2	10	8	9	10	0	1	3	9	1	0
N2	1	2	6	1	14	13	7	9	6	5	10	11	6	1	10	13
J1	1	0	0	0	2	0	4	3	0	1	0	0	0	0	0	0
J2	13	5	23	5	11	9	14	15	13	16	14	13	16	10	12	9
D1	2	0	1	1	2	1	10	2	0	1	0	1	1	7	2	0
D2	0	0	3	1	5	2	3	0	4	0	1	2	8	8	1	3
H1	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0
H2	1	3	0	1	7	1	6	4	0	0	0	0	1	0	0	2
C1	16	4	1	3	7	4	14	6	13	9	9	9	7	5	8	2
C2	9	1	3	2	11	12	5	11	2	6	14	7	4	3	6	15
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
TL	44	15	37	14	60	45	74	59	47	48	48	44	46	45	39	44
	59		51		105		133		95		92		91		83	

HL,Categories

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	33AQ*33AN*33BQ*33BN				34AQ*34AN*34BQ*34BN				35AQ*35AN*35BQ*35BN				36AQ*36AN*36BQ*36BN			
N1	4	5	5	5	3	0	1	3	8	7	2	0	2	3	3	2
N2	15	5	10	6	6	5	7	3	10	4	6	5	5	6	2	5
J1	0	0	0	3	1	0	0	0	2	5	1	1	0	0	0	0
J2	3	10	3	7	4	3	5	11	8	13	16	9	16	4	21	9
D1	1	2	1	4	1	5	2	3	7	4	2	0	0	8	7	4
D2	0	4	1	1	6	13	1	4	7	0	1	0	5	7	5	18
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	3	0	4	1	3	0	4	0	2	3	0	1	1	6	3	5
C1	5	3	9	9	1	3	1	2	4	2	7	10	2	5	6	3
C2	6	9	2	2	1	7	6	5	3	1	2	9	7	9	2	8
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
TL	37	38	35	38	25	36	27	31	52	40	37	35	38	48	49	54
	75		73		61		58		92		72		86		103	

HL,Categories

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	37AQ*37AN*37BQ*37BN				38AQ*38AN*38BQ*38BN				39AQ*39AN*39BQ*39BN				40AQ*40AN*40BQ*40BN			
N1	1	0	3	4	24	9	4	3	2	0	3	4	3	3	4	2
N2	2	6	1	0	9	7	24	9	12	10	7	6	9	5	4	8
J1	1	5	3	0	2	12	0	2	0	1	2	1	1	0	0	0
J2	22	22	16	23	13	6	7	14	19	12	19	21	11	6	22	15
D1	1	0	0	0	3	6	0	0	4	5	4	0	5	8	8	3
D2	0	0	0	0	1	7	9	5	6	7	1	0	6	4	5	3
H1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	1	1	0	0	1	3	2	4	1	0	1	1	1	3	0	2
C1	11	13	16	14	6	4	5	3	4	7	7	4	13	12	12	5
C2	6	6	14	9	1	3	2	3	7	5	3	5	11	5	4	6
TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TL	45	53	54	51	60	57	52	43	54	46	47	42	60	46	59	44
	98		105		117		95		100		89		106		103	

NL, Topic Patterns

	#Topics Initiated	Longest Supported Episode
#1A	13	31
#1B	6	13
#2A	3	25
#2B	3	28
#3A	9	30
#3B	7	11
#4A	4	24
#4B	6	29
#5A	2	12
#5B	6	46
#6A	5	25
#6B	1	30
#7A	4	36
#7B	7	26
#8A	2	21
#8B	3	28
#9A	9	23
#9B	1	6
#10A	3	54
#10B	0	0

NL, Topic Patterns (2)

	# Initiated	#Supported
#11A	3	52
#11B	2	30
#12A	5	25
#12B	5	16
#13A	1	27
#13B	3	29
#14A	1	2
#14B	5	39
#15A	5	18
#15B	3	33
#16A	2	27
#16B	5	39
#17A	9	21
#17B	2	9
#18A	3	20
#18B	4	23
#19A	6	18
#19B	2	32
#20A	4	29
#20B	2	48

HL, Topic Patterns

	# of Initiated Topics	Longest Supportive Episode
#21A	5	95
#21B	2	53
#22A	4	23
#22B	3	23
#23A	4	85
#23B	2	15
#24A	9	25
#24B	1	26
#25A	5	20
#25B	3	31
#26A	3	92
#26B	3	25
#27A	6	40
#27B	1	14
#28A	11	50
#28B	5	27
#29A	5	43
#29B	4	10
#30A	0	0
#30B	8	30

HL, Topic Patterns (2)

	# of Initiated Topics	Longest Supportive Episode
#31A	2	65
#31B	1	52
#32A	8	32
#32B	3	52
#33A	6	26
#33B	4	19
#34A	5	64
#34B	0	0
#35A	5	30
#35B	2	48
#36A	5	15
#36B	7	55
#37A	2	82
#37B	2	90
#38A	5	53
#38B	3	22
#39A	4	36
#39B	4	88
#40A	4	33
#40B	7	43

NL, Elements of Communication Breakdown

	Congruent talking			Breaks			Repetitions			Time Comments		
	Q	N	TL	Q	N	TL	Q	N	TL	Q	N	TL
#1	22	26	48	2	2	4	3	12	15	1	1	2
#2	2	1	3	1	2	3	0	1	1	0	0	0
#3	11	4	15	3	5	8	1	2	3	0	0	0
#4	13	10	23	1	0	1	3	1	4	0	0	0
#5	14	7	21	0	0	0	0	1	1	0	1	1
#6	9	7	16	0	0	0	0	1	2	0	0	0
#7	5	10	15	0	0	0	2	3	5	1	0	1
#8	11	8	19	0	0	0	0	0	0	0	0	0
#9	13	5	18	1	2	3	0	0	0	0	0	0
#10	15	4	19	0	0	0	0	0	0	0	0	0
#11	13	12	25	1	1	2	1	0	1	0	0	0
#12	9	7	16	0	0	0	2	1	3	0	0	0
#13	5	1	6	0	1	1	2	0	2	0	0	0
#14	10	6	16	0	0	0	2	0	2	0	0	0

NL, Elements of Communication Breakdown

	Congruent talking			Breaks			Repetitions			Time Comments		
	Q	N	TL	Q	N	TL	Q	N	TL	Q	N	TL
#15	9	7	16	0	0	0	0	1	1	0	0	0
#16	10	5	15	0	0	0	0	0	0	0	0	0
#17	9	3	12	1	0	1	1	5	6	0	0	0
#18	8	7	15	0	0	0	1	1	2	0	0	0
#19	6	6	12	0	0	0	1	5	6	0	0	0
#20	9	4	13	1	0	1	1	0	1	0	0	0

HL, Elements of Communication Breakdown

	Congruent Talking			Breaks			Repetitions			Time Comments		
	Q	N	TL	Q	N	TL	Q	N	TL	Q	N	TL
#21	17	19	36	0	0	0	0	4	4	0	0	0
#22	2	2	4	1	0	1	3	0	3	1	3	4
#23	10	18	28	1	0	1	2	2	4	0	0	0
#24	4	0	4	0	1	1	1	4	5	0	0	0
#25	4	11	15	1	1	2	0	2	2	0	0	0
#26	10	9	19	3	0	3	2	0	2	0	0	0
#27	10	6	16	0	1	1	1	1	2	0	0	0
#28	26	12	38	1	1	2	11	9	20	0	0	0
#29	13	6	19	0	2	2	1	0	1	0	0	0
#30	10	9	19	1	2	3	2	4	6	0	0	0
#31	16	11	27	1	3	4	5	4	9	0	1	1
#32	7	4	11	2	4	6	11	8	19	0	1	1
#33	3	3	6	3	3	6	12	10	22	0	0	0
#34	0	4	4	1	0	1	3	0	3	3	0	3

HL, Elements of Communication Breakdown

	Congruent Talking			Breaks			Repetitions			Time Comments		
	Q	N	TL	Q	N	TL	Q	N	TL	Q	N	TL
#35	1	1	2	1	1	2	6	3	9	1	1	2
#36	8	7	15	2	0	2	4	6	10	0	8	8
#37	21	13	34	1	1	2	1	4	5	1	0	1
#38	1	0	1	0	0	0	3	6	9	0	0	0
#39	4	7	11	3	2	5	16	8	24	0	1	1
#40	13	10	23	1	1	2	12	14	26	3	0	3

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BIOGRAPHICAL SKETCH

Susan K. Harned was granted a BS degree from Oklahoma State University and an MBA degree from the University of Texas at Arlington in business and retailing and worked in health care marketing and administration prior to beginning her career in speech-language pathology. She earned an MA degree at Northern Illinois University in 1991 where she was a graduate assistant on the family-based treatment grant. After working in the public school system and in home health care, she earned her certificate of clinical competency from the American Speech Language and Hearing Association (1992). She entered the doctoral program at the University of Florida with studies focused on neurogenic function and gerontology. Her clinical experience includes work in out-patient treatment, speech and language rehabilitation, swallowing disorders, traumatic brain injury, and neuromotor disorders. She was employed as a graduate assistant with responsibilities for teaching undergraduate courses and supervising students in the University of Florida's Speech and Hearing Clinic. She has given multiple presentations to the Summer Institutes of the Academy of Rehabilitative Audiology, national conventions of the American Speech Language Association, and national conventions of the American Society on Aging. She is currently employed as a traveling clinician working in the public school system in Oakland, California. Her caseload includes a large elementary school with students from diverse cultures and a junior high school with students using auxiliary communication devices.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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